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A SERIES OF TEXTBOOKS FOR PERSONS ENGAGED IN ENGINEERING PROFESSIONS, TRADES, AND VOCATIONAL OCCUPATIONS OR FOR THOSE WHO DESIRE INFORMATION CONCERNING THEM. FULLY ILLUSTRATED

HISTORY OF ARCHITECTURE AND ORNAMENT

SCRANTON
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PREFACE

The volumes of the International Library of Technology are made up of Instruction Papers, or Sections, comprising the various courses of instruction for students of the International Correspondence Schools. The original manuscripts are prepared by persons thoroughly qualified both technically and by experience to write with authority, and in many cases they are regularly employed elsewhere in practical work as experts. The manuscripts are then carefully edited to make them suitable for correspondence instruction. The Instruction Papers are written clearly and in the simplest language possible, so as to make them readily understood by all students. Necessary technical expressions are clearly explained when introduced.

The great majority of our students wish to prepare themselves for advancement in their vocations or to qualify for more congenial occupations. Usually they are employed and able to devote only a few hours a day to study. Therefore every effort must be made to give them practical and accurate information in clear and concise form and to make this information include all of the essentials but none of the non-essentials. To make the text clear, illustrations are used freely. These illustrations are especially made by our own Illustrating Department in order to adapt them fully to the requirements of the text.

In the table of contents that immediately follows are given the titles of the Sections included in this volume, and under each title are listed the main topics discussed. At the end of the volume will be found a complete index, so that any subject treated can be quickly found.

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HISTORY OF ARCHITECTURE AND ORNAMENT

(PART 1)

INTRODUCTION

ORIGIN OF ARCHITECTURE

1. The history of architecture antedates the written history of all mankind; but we are able to study the characteristics of certain ancient buildings from ruins that still exist, or from their restorations by modern students. From these can be formed a general idea of the habits and customs of races of people long disappeared from the earth.

The history of architecture is a history of the manners, customs, and temperaments of the people, as the buildings of each particular period reflect the social conditions that existed at the time they were erected. Primarily, architecture had its origin in the attempt of man to provide against the inclemency of the weather. At that time there were only three general classes of human beings: the hunter, the shepherd, and the agriculturist.

The pursuits of the first two classes tended to nomadic life, and therefore no permanent residences of these classes are found, the cave and the tent having been sufficient for their purposes. The agriculturist, however, settled where he tilled his land and gathered his crops, and it was he that planted the seed of a community that grew in proportion to the climate of the country, fertility of the soil, etc.

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LOCAL INFLUENCES

2. Six specific influences affect each historic style of architecture.

First, the *geographical influence*, which determines the mode of living, and the means of communication and transportation.

Second, the *geological influence*, which determines the quality of the buildings, as the presence or the absence of building stone, clay, or wood will determine whether the buildings shall be of stone, brick, or timber.

Third, the *climatic influence*, which determines the character of the buildings themselves, the size of their windows, and the projection and inclination of the roofs. As, for instance, in tropical countries, under the glaring sun, it is desirable to have small windows and dark, cool interiors, with projecting cornices that will shade the sides of the building from the vertical rays of the midday sun; whereas, in cold countries the roof must be steep to shed the rain and snow, and the windows large to admit the sunshine.

Fourth, the *religious influence*, which will affect the habits and customs of the people.

Fifth, the *political influence*, as the system of government will reflect the manners and temperaments of the influential portion of the nation.

Sixth, the *historical influence*, worked by the traditions and achievements of previous generations.

3. Under all of these six influences, each historic style has been further characterized by one of two systems of construction. The elements of these two systems are the *lintel* and the *arch*. Where all the openings of the wall of a building are covered by a straight beam, or lintel, the system is said to be *trabeated;* and where the openings are covered by any form of arch, the system is called *arched.*

Strictly speaking, all the buildings classified under ancient architecture were based on the principle of the lintel, and all buildings under modern architecture, are built on the principle of the arch, or a combination of the arch and the lintel.

CHARACTERISTICS OF STYLE

4. Each architectural style and period presents certain characteristics that have grown out of the foregoing influences by which it may be recognized and classified. Plans, walls, roofs, columns, openings, and ornament all vary to suit different conditions of civilization, but in the better periods they adhere to certain principles that cause these periods to assume architectural importance in the general history. The dates given are approximately the periods when the most important examples were erected.

5. Ornament.—The term **ornament** is applied to the enrichment, or embellishment, of any object. Ornament should be studied only in its relation to the architectural purpose of the object that it adorns. Ornament should be governed by certain principles and fixed laws, as *fitness* is essential to all good ornament. By fitness is meant its suitability (1) for the purpose for which the object is to serve, (2) for the position the object is to occupy, (3) for the material of which the object is constructed, and (4) for the materials of which the ornament is composed.

Natural forms, when reduced to the four preceding principles, are said to be *conventionalized*, and it should be observed that the best periods of art are those in which the ornament has been most successfully conventionalized.

Ornament may be *flat* (simply on the surface), *incised* (cut below the surface), or in *relief* (raised above the surface).

6. Ornament can be divided into three classes: *constructive*, where it forms a part of the object itself, as a column in a building; *representative*, where it represents some natural form; or purely *decorative*, where it exists simply to please the eye.

In the better periods of art, ornament ever has been symbolic of some geographical, political, or religious idea. Thus, in different decorative schemes, we find the rising sun emblematic of the East, a geographical symbol; the crescent emblematic of the Turkish nation, a political symbol; and the cross emblematic of Christianity, a religious symbol.

EGYPTIAN ARCHITECTURE

(4000 B. C. TO 200 B. C.)

INFLUENCES

7. Geographical.—In Fig. 1 is shown a map of Egypt and the surrounding region that gives an idea of the geographical character of this remarkable country. Along the bank of the river Nile stretches a narrow strip of fertile land, beyond which lies a sandy desert. This narrow strip constituted the entire country of Ancient Egypt. It had easy access to the Mediterranean Sea, to the Red Sea, and through the latter to the Arabian Sea. This geographical position assisted Egypt largely in the days of her greatness, as her products were easily exported, and those of foreign nations easily imported, through these natural highways, while the Nile formed the means of communication throughout the length of the home country. Through its peculiarity of annually overflowing its banks, and inundating the entire land, the Nile rendered Egypt more fertile and productive than any of the neighboring countries. Therefore, the civilization of the old world started on the banks of the Nile, and today we find the remains of ancient tombs and temples stretched from the city of Alexandria to the island of Philæ.

8. Geological.—While there were large quarries of limestone in northern Egypt, the central portion abounded in sandstone, and the southern section in granite. To this abundance of lasting building material we are indebted for the preservation of the great monuments of Egypt today. Clay was used to make bricks, but they were simply baked in the sun and entered into the construction of dwellings and buildings of minor importance. A suitable wood was not to be found, the palm and acacia trees being the only ones of importance that grew in this country.

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FIG. 1

9. Climatic.—In Egypt there are but two seasons: spring and summer. Frost and snow are unknown, and rain and fog are very rare. This delightful climate made architectural construction very simple, for, while precautions against heat were ever necessary, inclement weather was never considered.

10. Religious.—The Egyptian religion and its ceremonies were mysterious and complicated, and the expression of this feeling of mystery is one of the distinguishing characteristics of Egyptian architecture. The religion was practically polytheistic, although in theory they recognized but one god. They personified the phenomena of nature, attributing special functions to the sun, moon, etc., and to all animal creation. Hence, we find Egyptian gods represented in the forms of birds and beasts, with emblems of the sun and the moon worn as insignia of their particular power. The Egyptians believed in a highly refined future state, and took more care in the preparation of their tombs than they did of their dwellings. The dwelling house was looked on merely as a temporary lodging, the tomb being their permanent abode, and to this belief is due the existence of such monuments as the pyramids, which were erected as tombs for the emperors.

11. Political and Historical.—Ancient Egypt possessed a vast population, and under the strongest of despotic governments, a multitude of her people were compelled to work on the public monuments for little or no pay. Captives and foreigners were enslaved and put on this work, thus establishing a condition of society that was immensely favorable to the construction of large and important works.

The historical influences are hard to trace but pictorial decorations give us a general knowledge of the characteristic details back to about 4000 B. C. Greek and Roman authors and certain books of the Bible also give us some information.

12. Egyptian architecture is of little importance to the modern designer, but it is of vast importance to the student, as a starting point in the thread of history.

CHARACTERISTICS

13. Primitive Egyptian structures were probably composed of bundles of reeds bound together and placed vertically in the ground to form supports. Across the top were laid other bundles similarly bound, thus forming a skeleton framework that was afterwards filled in with clay. The doors and windows were probably framed of reeds in the humbler dwellings, and of palm trunks in the more pretentious residences. In any case, these dwellings were very perishable, and little remains at the present day in the way of information concerning them.

On the other hand, the public structures of the Egyptians were built with a predominating idea of durability. Immense stone columns, carved to represent conventionalized reeds or painted to suggest their vegetable prototypes, and massive tapering walls, with a hollow, projecting cornice, and incised decorations, suggestive at once of previous clay construction, were the chief characteristics of the later buildings.

Great extravagance of material marks all Egyptian architecture. Stone was quarried and transported in great blocks to the sites of the temples and tombs. Some tombs were cut into the solid rock of the mountain side, while the bodies of powerful rulers were placed within the pyramids, but the preparation of their final resting places was in all cases accompanied by great extravagances of material and labor. All the architecture partakes more or less of a religious character, as the Egyptian thought little of his earthly existence and devoted his life to preparation for the eternity to come. Hence his great care for the permanency of his tomb and the preservation of his body that he might be ready and presentable at the great day of resurrection.

Material was so abundant (see Art. **8**) and labor so cheap (see Art. **11**) that economy of either was utterly unnecessary. Massiveness, grandeur, and the expression of a deep and somber mystery (see Art. **10**) were the ideals of the Egyptian architect and these he readily attained under the geological and political conditions that existed.

FIG. 2

EXAMPLES

14. The existing structures from which the characteristics of Egyptian architecture are to be studied consist almost exclusively of tombs and temples. The pyramids differ in detail from all other structures, but may be generally classed with tombs. The Great Sphinx, although unique as a monument, is only one of the many temples that abound in this mysterious country.

15. Pyramids.—The pyramids form a distinct class by themselves, and present no points in common with any other Egyptian structures. They are of gigantic proportions and were considered by the Greek historians as the first of the seven wonders of the world. The most important pyramids, Fig. 2, are situated on the banks of the lower Nile near Gizeh. Of these, the largest is the Great Pyramid of Cheops, which is shown in Fig. 3. This pyramid was constructed of blocks of limestone, some of whose dimensions are so great that it is a mystery at the present day how they could have been quarried and transported with the primitive tools and machinery in use 3,000 years before the Christian era. The pyramid is about 800 feet square at the base and 450 feet high.

16. Other Tombs.—Besides the pyramids, which were royal tombs, there were smaller tombs for private individuals. The earlier tombs consisted of three parts: (1) the outer chamber, in which were placed food offerings for the deceased, wherein the walls were decorated with festal scenes; (2) the secret chambers, containing statues of the deceased and his family; and (3) the sarcophagus chamber at the bottom of a deep well, in which the sarcophagus, or stone coffin, was laid.

In Upper Egypt occur the rock-cut tombs. These are of little architectural value in themselves, but in some cases present architectural details that may have served as prototypes to later details. The roofs of the tombs of Beni-Hassan, in Upper Egypt, were supported on columns that

Fig 3

presented eight to sixteen sides, as shown in Fig. 4. These were slightly fluted, and were crowned with a projecting cornice that indicated a derivation from wooden origin.

FIG. 4

17. Temples.—Next to the pyramids in massive grandeur stands the Great Sphinx at Gizeh. This is a statue of the Egyptian god Harmachis and is carved out of solid rock, making a figure 146 feet long, 65 feet high, and 34 feet across the shoulders. The body, which has the form of a crouching lion, is now entirely buried in drifted sand, but the human head, measuring 28 feet from chin to top, and the broad, massive shoulders, are still visible, as shown in Fig. 5. Between the forefeet of the body is excavated a temple in which the god was

FIG. 5

worshipped, and if built at the same time as the sphinx, this temple is the oldest architectural monument on record, as the sphinx antedates the pyramids several centuries.

18. The most important architectural monuments of Egypt were its temples, and the general scheme of arrangement was the same in all cases. The Egyptian temple consisted of a small sanctuary, or *sekos*, that was reached through a large columnar hall known as the *hall of assembly*, or *hypostyle hall*, the latter term meaning roofed over on columns. In front of the hypostyle hall was a large open court, which was surrounded by high and massive walls and was entered between two tower-like front walls, called *pylons*. Flanking the entrance there were sometimes two obelisks each quarried in one great piece of stone, usually bearing hieroglyphical inscriptions. In fact every plain surface in the Egyptian Temples was covered with hieroglyphical ornament of some sort, either incised below the face of the stone or painted in horizontal lines as a written inscription or in a large pictorial subject representing some historical event.

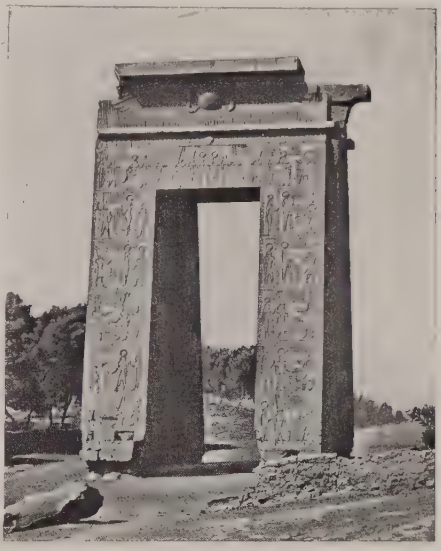

Fig. 6

Each of these parts was varied slightly in different structures, some having two courts in front of the hypostyle hall, known as the outer and the inner court, and in many of the temples the sekos was surrounded by a number of smaller apartments. On the outside of the temple, the entrance was approached through a long avenue—often a mile or more in extent—lined on each side with colossal sphinxes, and occasionally ending in a large monumental gateway advanced before the main entrance to the temple, as shown in Fig. 6. This gateway is called a *propylon*, and it stood alone before

the main entrance like a silent sentinel. The example shown is from the temple of Rameses III, at Karnak, and by comparing it with the surrounding trees, a fair idea of the magnitude of these great architectural details may be obtained. The faces of the propylon were always decorated with elaborate hieroglyphic devices. Hieroglyphs, meaning

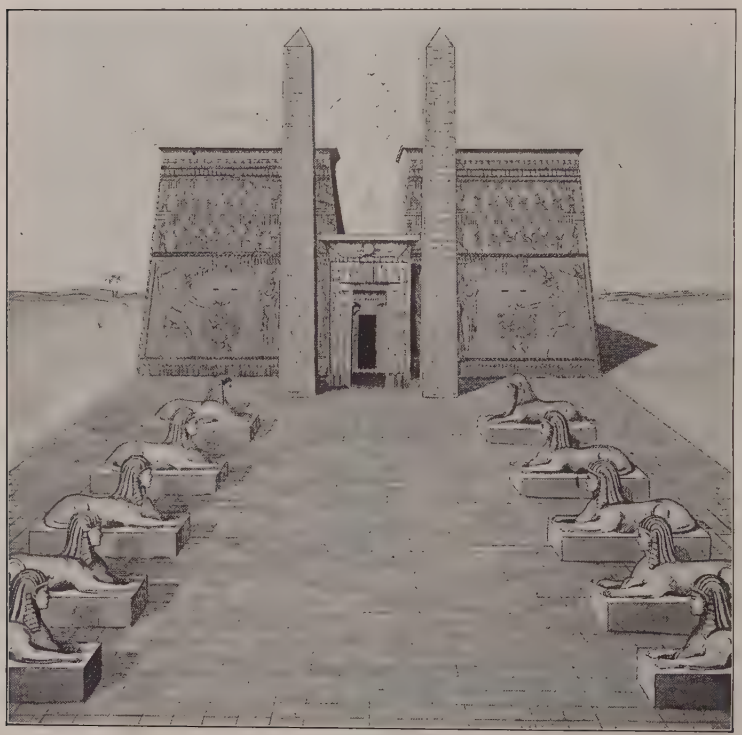

Fig. 7

sacred writings, consist of a series of pictures, or diagrams, illustrating sequent events. Beyond the propylon stand the two great pylons that form the outer front wall of the temple, and the entrance between these two masses is similar in detail to the gateway advanced in front.

A better idea of this arrangement can be obtained from Fig. 7, which shows a portion of the avenue, the entrance,

and pylons of the temple of Edfou, in Upper Egypt. In this case the propylon is omitted, but its form is duplicated as an entrance, and at the end of the long avenue of sphinxes stand two great obelisks—one on each side of the entrance. The walls of the pylons themselves are decorated with hieroglyphs, the design at the bottom representing a group of prisoners about to be executed by the king.

19. On the inside of the temple, these pylons were sculptured in much the same manner, although the lower part of

Fig. 8

them was largely covered by a roofed passageway around the edges of the court. Fig. 8 shows the appearance of these pylons on the inside, and a portion of the columns supporting the roof on the right side of the court. This example is taken from a temple on the island of Philæ in the upper Nile. The pylons were massive structures, and contained, in their interiors, a number of secret rooms accessible only to the priests and members of the royal family.

An entrance to the interior of one of the pylons is shown on the left. The general treatment around the door and

over it is precisely the same, but on a smaller scale, as the main entrance to the temple and the general character of the propylon illustrated in Fig. 6.

A better idea of the massiveness of these pylons may be obtained from Fig. 9, which is an illustration of the temple of Edfou, showing the taper of the walls from the ground upwards, a characteristic of all Egyptian architecture. This illustration is taken from above the side walls of the temple,

Fig. 9

so that the columns at the entrance of the hypostyle hall at the rear of the court may be seen.

20. In Fig. 10 is shown the plan of the Ramesseum, a temple built by, and named after, Rameses, who was king of Egypt about 1500 B. C. Here the sanctuary is shown at *a*, surrounded by a number of smaller apartments that were used by the priests and members of the royal family, both as places for their mysterious devotions and as royal residences, the king and his immediate relatives being considered earthly representatives of the gods. The sanctuary contained the shrine, and was entered through either of two portals, one from the hypostyle hall *b*, and the other

communicating with one of the sacred apartments. The roof of the hypostyle hall *b* was supported by two sets of columns,

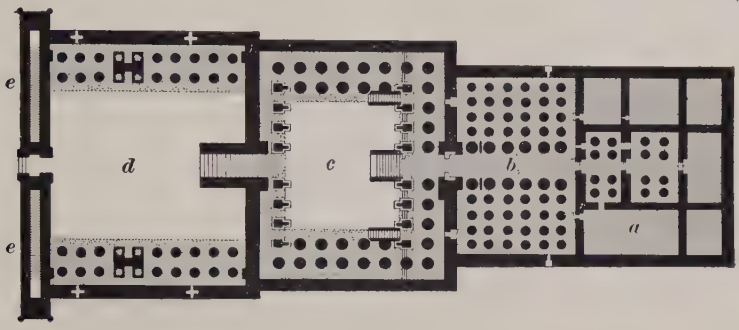

Fig. 10

the central ones being longer than those on each side, in order to provide a clearstory for the admission of light and air.

This is more clearly shown in Fig. 11, which was photographed from a model of the great hypostyle hall at Karnak.

Fig. 11

At *a* is shown the double row of tall columns, which are connected longitudinally by the stone lintels *b*, in order to receive

the edges of the stone slabs *c*, which form the roof over the *nave*, or central portion, of the temple. On each side of the columns *a* are the shorter columns *d*, which are connected transversely by the lintels *e*, and the inside row, longitudinally by the lintel *f*, to support the roof slabs *g* in the same manner as over the nave. An open space *h* is thus left to admit light to the interior of the hall and to form a clearstory similar to the same detail in the cathedrals erected in Europe many centuries later.

21. This system of supporting the roof is based on the first of the two principles of construction previously referred to, namely, the *lintel*. The spacing of the supports being governed entirely by the length of lintel the builders were able to quarry, the columns are exceedingly close together, and this is the case not only in Egyptian structures, but in all architectural edifices in which "the lintel system of construction" prevails. For this reason, large apartments were never entirely roofed over, but were open to the sky, either wholly or in part, as shown at *c*, Fig. 10, where the shaded portions indicate the covering roof.

The space shown at *c* is the inner court of the temple, from which the hypostyle hall must be entered. On each side of this inner court is a double row of columns supporting a roof extending from the side walls, while at the back is a single row of columns and a row of square piers that carry a portion of the roof extending over from the hypostyle hall. Another row of square piers carries the roof over the front end of this inner court, which, with the other partial coverings, surrounds the court with a narrow, projecting roof on all four sides.

22. The effect of this treatment, which was imposing in itself, was enhanced by colossal statues carved on the faces of the square piers. Three flights of stone steps led to the level of the hypostyle hall, the floor of which was considerably above the level of the inner court. Flanking the steps of the inner court *c*, and against the square piers that support the roof were colossal carved-stone images of

FIG. 12

Egyptian deities. It is a striking characteristic of Egyptian architecture and sculpture that everything shall be on a colossal scale. This characteristic is carried out in the pyramids, the sphinx, and in the colossal statues of Memnon, Fig. 12, on the north bank of the Nile at Thebes. These figures inspire one with awe simply by their magnitude, and as adjuncts to the complex ceremonies of the Egyptian religious rites must certainly have impressed the people with the insignificance of mere man. The entrance court *d* was a comparatively plain enclosure, with columns on each side and a single flight of steps leading up to the floor of the inner court. This court was entered through a narrow portal flanked on each side by the massive pylons *e*.

Fig. 13

23. Obelisks.—The obelisks in front of a temple as at Edfou, Fig. 7, are characteristic of Egyptian art. The example in Fig. 13 is one of a pair of obelisks known as "Cleopatra's needles," and is shown as it stood in the city of Alexandria, for nearly 2,000 years, with its companion, before the entrance of the temple at Heliopolis. It is 67 feet high, and 7 feet 7 inches square at the base. It was removed to Alexandria by the Roman emperor Augustus just before the beginning of the Christian era. In 1878 this obelisk was transported to New York, where it now stands on a mound in Central Park.

(a) (b) (c)

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FIG. 14

ANALYTICAL STUDY

PLANS

24. Egyptian temples were planned entirely for interior effect. The dimly lighted hypostyle hall was a forest of columns, producing a deep feeling of grandeur and mystery. The temples were not always symmetrical, and being erected at irregular intervals, they expressed the ideas of different generations quite as much as do the cathedrals that were erected centuries later. See Fig. 10.

WALLS

25. The buildings were surrounded by walls of tremendous thickness that were usually built of granite. The faces of the walls sloped inwards, and the tops were surmounted by a massive concave cornice over a rolled molding, as shown at the top of the propylon in Fig. 6.

ROOFS

26. The roofs consisted of massive flat stones, supported on lintels between the columns, as shown in Fig. 11.

COLUMNS

27. The columns were thick and massive, their height seldom being more than six times their thickness. Five general designs were used, all derived from some conventionalized form of the lotus, papyrus, or palm. The earliest columns were square or polygonal, as in the tombs of Beni-Hassan, Fig. 4. Subsequently, they became round, tapered toward the top, and spread out into an enormous bell-shaped capital that supported the roof. They were carved and painted to represent the full blossom of the papyrus or palm, as shown in Fig. 14 (*a*) and (*c*), or to represent the lotus blossom, as at (*b*). The edge of the shaft at the bottom was sometimes

rounded off and decorated with a pointed ornament representing the large leaves around the sprouting lotus, above

FIG. 16

which the top of the column would be contracted to form a conventional lotus bud under a square block, as shown in Fig. 15 (*a*). Occasionally, as at Karnak, Fig. 11, the entire column was decorated in color with hieroglyphs, as shown in Fig. 15 (*b*). The corners of the four- and eight-sided columns were sometimes rounded off, while the plain sides were reeded, thus giving the appearance of a bunch of stems, which were ostensibly held in place by a number of bands, as shown in Fig. 15 (*a*).

FIG. 17

28. Another form of column had the upper portion designed to represent a *naos*, or cell, similar to the sanctuary, with a miniature entrance and pylon on each side, under which were carved heads of Hathor or Isis, two prominent deities in Egyptian mythology. These columns are known as *Hathor-headed* or *Isis-headed*, as the case may be, and are as shown in Fig. 16, which illustrates a portion of the temple of Hathor at Dendarah. Fig. 17 shows a restoration of one of these columns, from which the details may be more clearly understood.

(a)

(b)

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FIG. 15

In the architecture of Egypt, there were no established rules of proportion. The height and projection of the capital bear no fixed relation to the length or diameter of the column, as do these details in later architectural styles, and the construction being almost entirely of stone, the columns were placed very close together, so as to receive the lintels and slabs that formed the roof.

OPENINGS

29. The openings were uniform, in general style, and resembled the propylon in general treatment. Windows were rare, as the clearstory (see Fig. 11) admitted sufficient light for the mysterious rites that were performed in the temples.

MOLDINGS

30. Small decorative details called **moldings** are used to separate architectural members in a building. They consist of plane or cylindrical surfaces run in bands vertically or horizontally. In Egyptian architecture, there are few moldings, but each is thoroughly characteristic of the style. The principal ones are the large concave member crowning the walls of the temples and pylons, Figs. 6 and 7, and the smaller roll, or band, separating this crowning member from the lower wall.

ORNAMENT

31. Egyptian ornament was symbolic and an important factor in the architectural style. It was represented in all three classes, based on few types, and in many cases is so conventionalized that the type cannot be determined.

It is of importance that the student should thoroughly understand the difference between *style*, *class*, and *type*. The term **style** is used to indicate the period or nationality of the ornament or architecture, as the Egyptian style; the term **class** is applied when it is desired to indicate a subdivision

of some style, as the constructive class of Egyptian ornament; and the term **type** is used to refer to the natural form from which the ornament is derived.

32. Types.—The types derived from the vegetable kingdom were the lotus, papyrus, and palm. The most conspicuous type in Egyptian art is the **lotus**, a plant growing on the banks of the Nile and somewhat resembling the pond lily, but differing from it in coloring. It stands high out of the water, as shown in Fig. 18, with petals of a rich purple and a heart of deep orange. The lotus was a sacred flower, and as an offering to the gods was conspicuous in the highest forms of worship.

FIG. 18

In each architectural style, some one particular vegetable type seems to stand out conspicuously in the decorations. In Egypt, the lotus was used in a multitude of different forms in almost every decorative scheme throughout its history. In fact it is difficult to conceive a characteristically Egyptian design that does not introduce some suggestion derived from this flower. The devotion of the Egyptians to this particular emblem amounts almost to worship. It was painted on their walls, mummy cases, and coffins; it was carved in their monuments, temples, and tombs; it was wrought in precious metals and worn as jewelry; it was woven in their linen garments, and in fact it was everywhere.

The **papyrus plant,** shown in Fig. 19, was also used largely in Egyptian art; it was associated with the Nile, on whose banks it grew, but not to such an extent as the lotus. It was the first material used to manufacture paper, which derives its name from this plant.

Fig. 19

Feathers presented another type frequently met with in ornament, and these, with some birds, particularly the vulture or buzzard; the asp, a small, venomous serpent; and the beetle, were about all the types borrowed from the animal kingdom.

33. Winged Disk.—The ornament known as the **winged disk,** Fig. 20, consists of a solar disk, supported on each side by an asp, the royal symbol of Upper and Lower Egypt. The wide outstretching vulture's wings symbolize the untiring activity of the sun in its beneficence; hence, a divine protecting

Fig. 20

power. It is sometimes varied to include the figure of a goddess or the body of a vulture, in place of the disk, and the wings are occasionally curved upwards.

34. The Scarabæus.—The **scarabæus,** Fig. 21, consisted of a beetle holding a sun disk between its front feet and a small ball between its hind feet. It was identified with the rising sun, and was emblematic of creation and resurrection, or new birth. Its exact significance is somewhat complicated, as are in fact all Egyptian emblems; but, owing to the habits of the beetle, slowly developing from a grub through various stages to a full-grown insect, it is emblematic of progress and evolution.

FIG. 21

35. Wall Decorations.—The **wall decorations** usually consisted of hieroglyphic representations of some historical event. In private tombs, the life of the occupant was represented, and in temples, the life of the gods or the history of the nation was depicted. Each representation was not only a detail of the wall decoration, but a hieroglyphic record of a fact. Sometimes it was carved in the surface of the walls, and sometimes merely painted; and, occasionally, it was both carved and painted. It was always most conventional, and certain details, such as the lotus and papyrus, were represented in the strictest geometrical arrangement, usually showing the bud, blossom, and fruit in regular order, typifying the development of the entire plant.

FIG. 22

In Fig. 22 observe the straight, stiff stem and trumpet-shaped blossom, the sharp-pointed petals of the calyx, and the geometrical arrangement of the entire plant, with all its distinguishing characteristics emphasized to produce the simplest and severest conventionalism.

Egyptian carved ornament of this character is nearly always in low relief, and is sometimes merely incised or outlined in the surface of the wall, as shown in Fig. 23.

On work executed in a later period, the background is sometimes cut away, leaving the carved ornament in full relief, as shown in Fig. 24.

In Figs. 25 and 27 are shown several characteristic wall decorations, wherein the lotus, papyrus, and other types are introduced in great variety, showing the changes that can be worked on a few ideas. These were introduced in the decorative schemes of the tombs and temples, and give a fair idea of the general wall treatment.

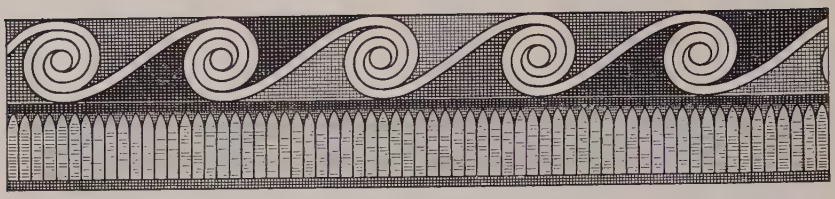
Fig. 23

Fig. 24

The scroll borders at (*a*) and (*b*), Fig. 25, represent conventionalized waves of the Nile, and were frequently used in a multitude of forms as borders, or frames, to wall panels filled in with surface ornament.

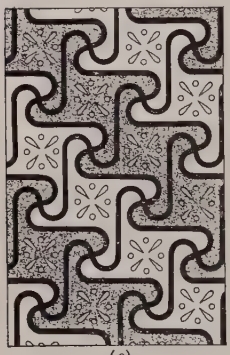
The border shown at (*f*) is taken from a narrow frieze in one of the tombs. The lotus is here used in two forms, with a geometrical arrangement above and below. Another border generally used in a vertical position is shown at (*g*). Here, the lotus blossom is introduced in the central strip, which is flanked on each side by a series of disks.

At (*c*), (*d*), (*e*), and (*h*) are shown forms of surface decoration that were used within the panels surrounded by the

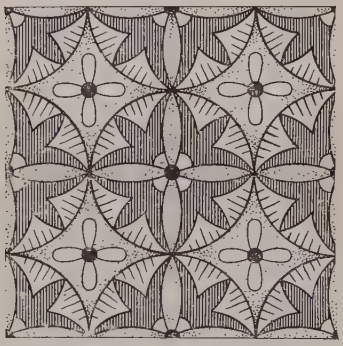


(*a*)

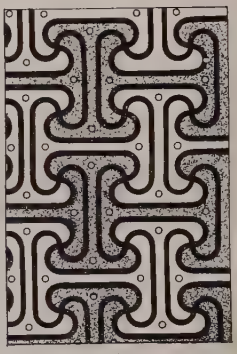
(*b*)



(*c*)



(*d*)



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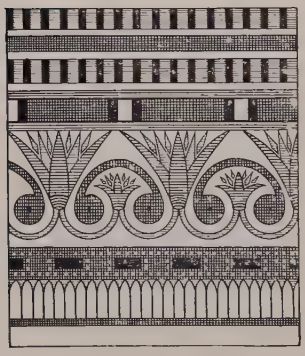
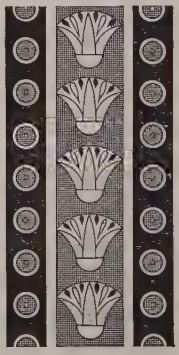
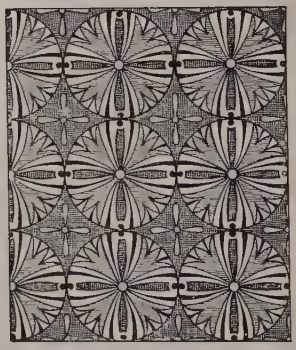


(*f*)



(*g*)



(*h*)

FIG. 25

preceding and many other designs of borders. No type is traceable in (*c*) or (*e*), but in (*d*) and (*h*), the conventionalized lotus blossom is used four times in each circle. Egyptian surface decoration was always geometrical. The minor subdivisions were always circles, squares, spirals, triangles with straight or curved sides, or an interweaving of straight and curved lines, as in (*c*) and (*e*). Wall decorations treated in this geometrical manner are called **diapers**, and are found in all periods or decorative art.

36. Rosette Forms.—The **rosette forms** shown in Fig. 26 are some of the many observed in Egyptian ornament. At (*a*) is shown a simple circle with an inner circle, and the space between them is divided by straight lines into eight equal parts. The transition from this form to the form shown at (*b*) consists merely of a notching of the edge of the outer circle where the lines intersect the circumference; (*c*) is the same as (*b*), except that the dividing lines are arranged in pairs, thus making each segment independent and by itself. From (*c*) to (*d*), the segments are made narrower, until they are very nearly the size of the spaces between them, and at (*e*) the extreme limit is reached. Here, what might be considered the petals of the floral device are separated from the center and from one another entirely, and become independent elements of the design.

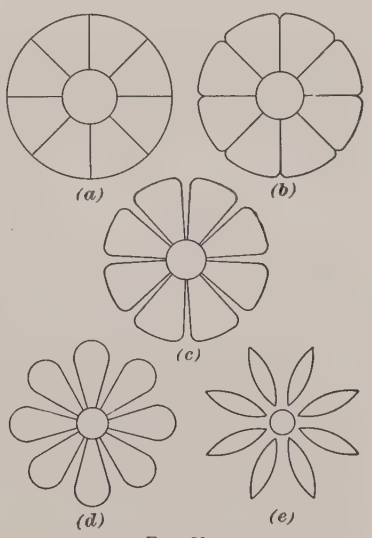


FIG. 26

37. The diapers and borders shown in Fig. 27 give some idea of the color combination used by the Egyptian artists. Here are found the same types that characterized all Egyptian ornament, but used in many different ways,

which give variety and charm to successive combinations of the same details. At (*a*) and (*b*) the predominating types are the spiral and the lotus blossom and rosette combined with the scarabæus in one case and a hieroglyphic inscription in the other; yet similar as are these elementary details, the decorative effect is entirely different. At (*c*), the spiral lotus and the rosette are again combined, and another design totally unlike the preceding is the result. Although the spiral is the only prominent element evident in (*d*), the inclosed form is undoubtedly derived from the papyrus. The border decoration shown at (*e*) is composed entirely of lotus buds and blossoms, arranged alternately. These are only a few of an almost endless variety of wall decorations based on these simple characteristic types.

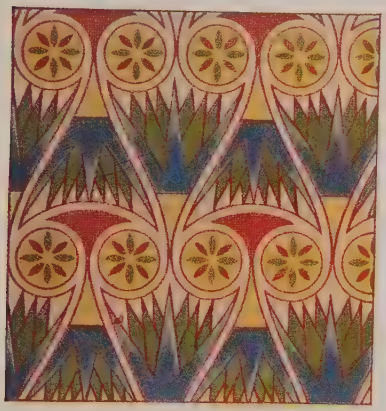
There is a sharp distinction between what is termed diaper treatment and wall painting. The former consists invariably of small, geometrical subdivisions presented in a repeating pattern in all directions, while the latter term is applied to large surfaces treated in a pictorial manner, and not repeating in design.

38. Wall Paintings.—In Fig. 28 is shown a painted wall ornament from the tomb of Seti I. It represents the "sacred bark," the ceremonies connected with which were an exceedingly complicated but important branch of the religious devotions of the priests. This device frequently appears in the sculpture and paintings of the tombs, and usually represents the funeral of one of the gods. Everything is arranged in a most orderly manner, as will be observed, and every detail is placed to convey a certain significance. It would be impossible here to go into all the explanations connected with Egyptian hieroglyphic ornament, but this illustration is sufficient to show the general subdivision of the walls and the completeness of the illustrated idea.

The civilization of Ancient Egypt presents nothing in common with that of the present day and the Egyptian style therefore finds little application in modern architectural constructions.

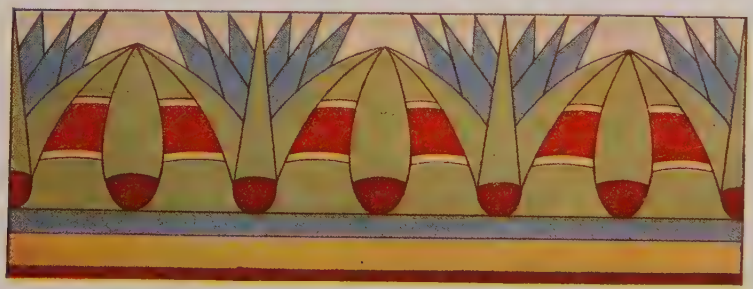
(a)

(b)



(c)

(d)



(e)

FIG. 27

Occasionally it is used in the design of a tomb or of a building devoted to Masonic or other secret society rites.

FIG. 28

Then its application is appropriate either on account of its historical associations or its suggestion of mystery.

REVIEW EXERCISES

1. What does the term conventionalized mean?

2. What is the distinction between the terms: (*a*) style, (*b*) class, and (*c*) type?

3. What influences must be taken into consideration in studying an architectural style? Describe the effect of each.

4. For what modern application is the Egyptian style suitable?

5. Make a design in color for a wall diaper in the Egyptian style, using the types herein described, or other ones similar to them, but not a copy of the illustrations. The design should be not less than 6 in. × 6 in., and should be made on a sheet of white drawing paper 9 in. × 12 in. The design need not be entirely colored, but a section of it should be completed to show the scheme and coloring.

6. Make a design in color for a column in the Egyptian style, but do not copy it directly from any illustration; or, make a drawing of a propylon similar to Fig. 6, but complete it with all details restored and colored and hieroglyphics incised, as shown in Fig. 23. The design is to be 10 inches high on a sheet 9 in. × 12 in.

ASIATIC ARCHITECTURE

(2000 B. C.)

INFLUENCES

39. Geographical.—The map, Fig. 29, shows a portion of Western Asia including the valley between the Tigris and Euphrates rivers. The land watered by these rivers was very fertile, and the country between them, known as the plain of Mesopotamia, was irrigated by canals extending from Babylon to the city of Nineveh.

Civilization in this country started at the mouth of these rivers, where they emptied into the Persian Gulf, and spread toward their sources, just as Egyptian civilization formed along the Nile. In Western Asia, however, civilization spread toward the north, while in Egypt it spread toward the south.

40. Geological.—This entire section, with the exception of Assyria, possessed no stone and grew very little vegetation of the character suitable for building materials. The soil was alluvial and readily baked into bricks, which formed the principal building material. Sun-baked bricks were used for the body of the walls, while tile, or kiln-burned bricks, were occasionally used as a facing. In Assyria, however, some stone was used, and the inside and outside facings of the walls were finished with either alabaster or limestone slabs, on which were carved allegorical figures in low relief. These carvings and the inscriptions on the stones are of vast importance historically, as they convey much information concerning the character of the buildings of the period, although the buildings themselves have long since crumbled away.

41. Climatic.—In Chaldea, the country was swampy and unhealthy, and the entire region was infested with

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FIG. 29

venomous insects, so that in the cities it was necessary to construct all buildings on platforms so as to prevent insects and reptiles from crawling into them. During the rainy season, too, there were heavy floods near the rivers, rendering it further necessary to raise the communities above the annual inundations. In Persia, however, there was a high plain, and there this elevated construction was not required.

42. Religious.—The people of this section were extremely superstitious. They worshiped the sun, the moon, and the powers of nature—fire, wind, thunder, etc. Temples and images of gods were not common among them, as their sacrifices to the sun and other celestial bodies were made in the open air. The entrances to their palaces were guarded by ferocious-looking stone bulls with human heads, Fig. 30, that represented some genius or beneficent power emanating from their ideas of deity.

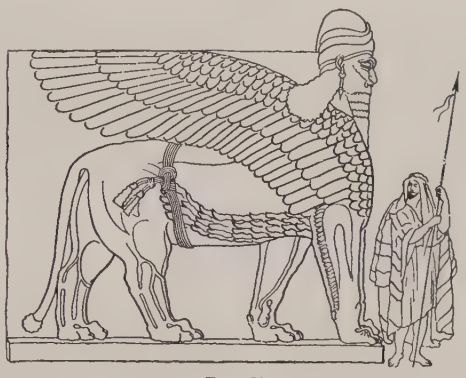


FIG. 30

43. Political and Historical.—The sculptures and carved inscriptions give a very clear idea of the character of the people and customs of the period. The inscriptions were formed in a peculiar kind of wedge-shaped characters, called *cuneiform*, and records were made by pressing small wedge-shaped devices into the soft clay before baking it into bricks. Instead of paper, small tiles and tablets were used for recording facts, and so much in this form and character was written that large libraries were formed, the books of which consisted of burnt tiles.

44. The history of this section can be determined only by the translation of the cuneiform characters, which, up to

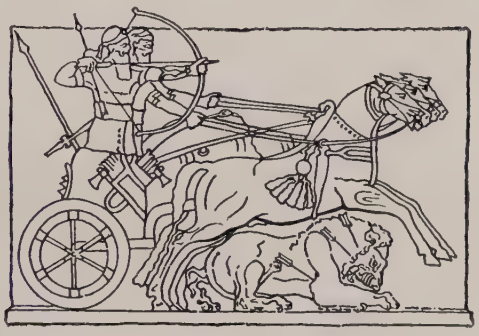
the present time, has only been imperfectly carried out. The earliest king mentioned in the cuneiform inscription reigned 4500 B. C., and the kingdom established extended north, along the valley of the Tigris. About 1700 B. C., however, Assyria asserted her power over the rest of the empire and became a ruling influence in Western Asia. An Assyrian king named Sargon defeated the Egyptians and the Philistines, who were allied with them, and occupied Egypt. This may have introduced Egyptian influences into their architecture. About 672 B. C., the Egyptians conquered the Assyrians and shook off their yoke. Nineveh was destroyed in 609 B. C., and the Assyrian kingdom was divided. Babylon became the leading city until taken by the Persians in 539 B. C. The country remained under the rule of the Persians until 333 B. C., when it was taken by the Greeks under Alexander the Great. Thereafter its history is merged with that of Greece.

EXAMPLES

45. The only buildings of which a vestige is left at the present day to enlighten us to the art of Western Asia, are the palaces. The civilization of the valley of the Tigris and Euphrates rivers was next in antiquity to that of Egypt, but was far inferior to that country in art and architecture. The subjects of the two kingdoms—Chaldea and Assyria—that ruled this valley differed widely in character and culture, but the lack of good building material and the flatness of the country imposed on both nations similar restrictions of conception, form, and material. Not a tomb nor a temple of these ancient nations stands today to enlighten us on the details of their system of construction, but the remains of their palaces, especially those of Assyria, show a scale of magnificence that is simply astounding, though these palaces were erected of brick, the poor quality of which prevented the builders from carrying their structures to any great height.

Elevation above the level plain of the valley was attained by first erecting immense terraces, or mounds, which were

faced with stone slabs or hard-burned bricks, and on these mounds buildings of moderate height were constructed. The absence of stone suitable for columns, and the difficulty of procuring beams of long span, made broad halls or large, covered rooms practically impossible, although, unlike the Egyptians, they used the arch to span the principal openings, and it formed an important element in their style. The plans



(*a*)

(*b*)

FIG. 31

of these palaces, therefore, consisted of a series of long corridors and small cells. The interior walls were wainscoted to a height of 8 or 9 feet with alabaster slabs richly carved in low relief to represent hunting scenes, battles, tribute to the kings, and glorification of the gods, as shown in Fig. 31. Plastered walls were painted in brilliant colors, and every art known to these people was employed to make their palaces a maze of richness and architectural splendor.

46. The system of construction was simple. The clay walls, faced with alabaster slabs, enameled tile, or hard-burned bricks, were roofed over with cedar beams, and the roofs were paved with tiles to form terraces or roof gardens. These are referred to in ancient writings as the "Hanging Gardens of Babylon." Light was admitted through small windows close to the ceiling, and usually certain rooms in the interior of the palace were entirely windowless. Even at the present day the inhabitants of these districts take refuge from the torrid heat of the summer midday in windowless apartments, lighted only by lamps. Above the wainscots that line the courts and corridors were wide friezes of enameled brick, richly ornamented with various symbolic forms, used as decorative motives. Of these the most frequent were the "sacred tree," Fig. 32, the winged bull, Fig. 30, and other mythological monsters, together with palmettes or fan-shaped floral designs, and the lotus blossom. The latter, which were used largely around the archivolts over the arched entrance gates, were probably derived from Egypt. The most characteristic details, however, were the winged bulls. Though of tremendous proportion, every part was minutely wrought, even to the details of the head-dress, the hair, the feathers of the wings, and the anatomy, as shown in Fig. 30. The worst feature of the Assyrian constructions was their perishable character. With columns and roofs of wood, covered with several feet of earth to keep out the heat, and walls of simple clay—the ravages of time caused their identities to become buried in their own materials.

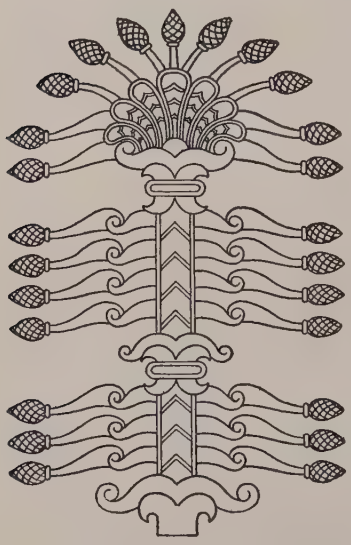


FIG. 32

ANALYTICAL STUDY

PLANS

47. Assyrian palaces were planned with open central courts and long, narrow rooms and halls. They were raised on platforms, or terraces, from 30 to 50 feet in height. Egyptian temples were planned solely for interior effect, while Assyrian palaces were designed for both interior and exterior effect.

WALLS

48. The walls of the Assyrian palaces were constructed of brick and were faced with stone slabs, whereas the walls of the Egyptian temples were of solid granite. In Assyria, the brick walls alone remain, the columns, which were of wood, having long since perished. In Persia, the walls, which were thin, have crumbled away, but the massive blocks that flanked the openings, the immense stone columns, and the marble stairways still remain.

ROOFS

49. The roofs consisted of wooden beams supported on wooden columns, and clay walls tiled over on the outside. The more important rooms were arched over, or vaulted, with brick; whereas, in Egypt, the roofs were invariably of stone slabs supported on stone lintels.

COLUMNS

50. In the earlier periods, the columns were made of wood, but in the later periods some of them were built of stone. The most ancient cities, being in Chaldea and Assyria, where there was no stone, possessed buildings only of wood and brick or tile. However, when the Persians returned from Egypt, they built at Persepolis, where limestone abounded,

(a)

(b)

(c)

FIG. 33

columns of stone to support the roofs of their palaces, tombs, and temples. The capitals of these columns were characteristic, and consisted of the double horse, double bull, double unicorn, double griffin, etc., under which a scroll device was sometimes introduced as shown in Fig. 33 (*c*). The capitals (*a*) and (*b*) are placed abruptly on top the shafts without any intervening moldings or preparation, but in (*c*) the top of the column has been varied to present a transectional condition from the round reeded shaft to the animal from above. The beams of the roof rested on the heads of the animals in one direction, as shown at (*c*), and on their backs and between their heads when running in the opposite direction, as shown at (*b*) and (*c*), while different animal forms were used for the capitals in different cases, and some were supported on scrolls while others were not, the bases were almost universally of the type shown in (*a*) and (*b*). The scrolls shown at (*c*) are interesting owing to the later appearance of a similar device in Greek capitals; some of the Assyrian sculptures show the scroll device in a horizontal position across the top of the column, but no examples of that form exist in the structures of which sufficient material remains to study from.

OPENINGS

51. The temples were lighted by means of a clearstory similar to that in the Egyptian temples, but the palaces depended more on their doorways to let in a flood of light where necessary, and consequently they made these openings of enormous size.

MOLDINGS

52. As in Egypt, the architects of Western Asia made little use of formal moldings. Plain sinkings were used in the bases and capitals of the columns, with an occasional projecting rib or incised groove.

ORNAMENT

53. The ornament of Assyria was probably borrowed from Egypt, as there are many points of resemblance in the two styles. The sculpture of the Assyrians seems to have been a development of that of the Egyptians, but descended rather than advanced in scale of perfection. Egyptian sculpture degenerated toward the end of the 4th century B. C., as it expressed an unnatural swelling of the limbs that was at first only lightly indicated but gradually became almost exaggerated—the conventional having been abandoned for an imperfect attempt at the natural. In Assyrian sculpture, the attempt was carried still further, and, while the general arrangement of a subject and the pose of a single figure were still conventional, an attempt was made to express the muscles of the limbs and the rotundity of the flesh to an extent that destroyed the conventionalism of the whole. In all art, this is a symptom of decline. Nature should be idealized, not copied.

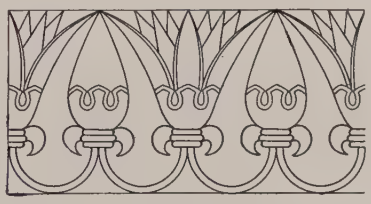


FIG. 34

Assyrian ornament is not based altogether on the same types as the Egyptian, but is represented in the same way.

In both styles, the ornaments appear in relief, as well as painted, in the nature of hieroglyphic diagrams. With the exception of the pineapple, and the adaptation of the Egyptian lotus, which is shown in Fig. 34, Assyrian ornament does not seem to be based on any natural type.

54. The religion of the Assyrians differed widely from that of the Egyptians, and, although their combinations of

Fig. 35

forms somewhat resemble certain of the Egyptian deities, the style in which they sculptured them was below the standard of art and practice in Egypt. In Fig. 35 is shown an example of this work representing the winged deity Asshur, in which may be seen the excessive effort to represent the rotundity of muscular developments just mentioned. The attempt to represent the muscular characteristics of this

figure is exceedingly inartistic, and, although the attempt to present an appearance of power and strength is well carried out, it is done with much less delicacy and refinement than would be expected if the work were an example of Egyptian art. The vulture head and wings are undoubtedly borrowed from Egypt, and the pose of the body and limbs is strongly suggestive of Egyptian ideas. The position of the hands seems to be repeated in nearly every example of Assyrian ornament where the figure represents a deity, and is similar to certain Egyptian productions of the kind, except that the limbs are clumsy and the molding possesses much less refinement. This is characteristic of all Assyrian sculpture. Brutal strength seems to have been of more importance in many cases than graceful proportions. The details of every part, however, were finely wrought and no item of the ornamental scheme seemed to have been considered of lesser importance than another. As said before, the pineapple seems to be the only new vegetable type introduced into their decorative schemes. It is apparent as the fruit on the sacred tree, Fig. 32, and is also seen in the right hand of the deity Asshur in Fig. 35. Its particular significance is not known, and although it may have played as important a part in the Assyrian devotion as the lotus did in the Egyptian, it was not developed in the designs of other countries as were the devices based on the lotus blossom. The Assyrian style finds no place in modern architectural applications.

GREEK ARCHITECTURE

(500 B. C. to 150 B. C.)

INFLUENCES

55. Geographical.—The map of Greece shown in Fig. 36 presents a small country projecting into the Mediterranean Sea, which washes its shores on three sides. There are numerous islands scattered about its coast, and many natural harbors that the natives found convenient for the development of trade and commerce. The country itself was active on account of the population concentrated along its seacoast, but the mountainous character of the interior prevented any overland means of communication until Greece came into the possession of the Romans.

56. Geological.—The principal geological product of Greece was white marble, to which we owe much for the magnificent development of our artistic taste. White marble is the best material known for monumental buildings, and was found in great abundance in certain localities. In other parts of Greece, buildings were constructed of bricks. These were occasionally coated with a cement composed of marble dust and lime and would take as high a polish as the marble itself.

57. Climatic.—The climate of Greece varied from extreme tropical heat in summer to the severest cold in winter; therefore, her architects had to provide against the inclemency of these seasons. The civilization of the country was unique, situated as it was between the rigorous surroundings of Northern Europe and the passive conditions of the Orient, or Southern Asia, and the Greeks therefore worked out their architectural problems with the energy of the one and the deliberation of the other that was sure to attain the highest degree of perfection.

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FIG. 36

58. Religious.—The Greek religion was not a direct worship of idols, but of the phenomena of nature, of which the gods were personifications. Owing to the isolation of the different communities, each had its own festivals and ceremonies. The priests, generally speaking, were of little importance, and served for a brief period only. Both men and women officiated at the altars, and the temples themselves contrast with the Egyptian temple, particularly in the fact that a single, small, well-illumined cella in the center replaces the dark, mysterious halls of the superstitious Egyptians.

59. Political and Historical.—The Greeks, owing to their geographical surroundings, were naturally colonists, and migrated to the coast of Asia and across the Mediterranean. This emigration was established by the Greek government as early as 700 B. C., both to reduce the crowded population and to encourage trade. The colonies were therefore frequently occupied by a people much more enterprising and energetic than those of the mother country. For this reason we find some of the most important buildings in Asia Minor and on the islands. It is not remarkable, either, to find in these Asiatic edifices an influence of Orientalism. The people themselves, as a whole, were fond of national games and religious festivals, and thus became united in reverence for their government and their gods. They loved music, drama, and games in physical culture, and liberally patronized the fine arts. They lived an outdoor, open-air life, and public ceremonies and courts of justice were frequently conducted in the public squares.

60. The early Greeks, called Pelasgi, were a warlike race and contributed much to their descendants in the islands. They were conquered by a neighboring tribe, who in turn were defeated by some tribes from the north, called Dorians. The Dorians afterwards established themselves at Sparta. Later, the Persians overcame the Greeks in Asia Minor and made them subjects of the Persian Empire. These Greek subjects revolted, however, and war between Persia and

Greece resulted in victory for the Greeks at the battle of Marathon, in 490 B. C. Ten years later a second Persian invasion under Xerxes ended in the naval victory of Salamis, in 480 B. C. The great national exultation caused by these two victories over the Persians is largely responsible for the fact that most of the important temples were built within the 50 years following this period. Under Pericles, from 444 to 429 B. C., Athens reached the zenith of her prosperity in artistic development. The rapid growth of Athens excited the jealousy of the neighboring city of Sparta, and brought on another war, known as the Peloponnesian war, which lasted from 431 to 404 B. C. At the close of this war, Greece was weakened internally and the ascendency of Athens was destroyed forever. Greece became a Roman Province in 146 B. C.

FIG. 37

61. The few architectural monuments now standing, from which we can judge of the art and skill of the early Pelasgi, consist of massive walls, built of huge pieces of roughly hewn stone laid up together without mortar, as shown in Fig. 37. The immense proportions of these stone blocks suggest that the method of their quarrying was derived from Egypt, while the shape of the openings in the walls, produced by corbeling each successive block slightly beyond the next one below, was probably derived from some of the structures observed in Asia.

The Greek historians looked on such achievements in construction as something beyond the power of ordinary men, and declared these walls to have been built by the Cyclops, a mythical tribe of giants; and to work of this character the Greek legends ascribe the name of *Cyclopean masonry*. This system is somewhat more clearly shown in their tombs, the

most important of which is the Treasury of Atreus, Fig. 38, built at Mycenæ. The entrance *a* opens into a circular chamber, the side walls of which are corbeled over to make a pointed dome. These tombs were called *treasuries*, because it was customary to deposit in the vaulted chambers valuable chalices of gold, silver, or bronze, together with coins, pottery, etc. These tombs, or treasuries, are of architectural importance, however, only so far as they illustrate the system of construction, and thereby preserve the thread from a simpler system that preceded to an advanced system that followed. It should be noted that though the walls of this structure form a pointed dome, the beds of the stones of which it is built are horizontal and do not radiate from the centers from which the arcs of the sides are struck. It will be seen later that this is not a true vault in the sense that vaults were constructed by later people and therefore does not contradict the fact that Greek architecture is a purely trabeated style and never took advantage of the mechanical principle of the arch.

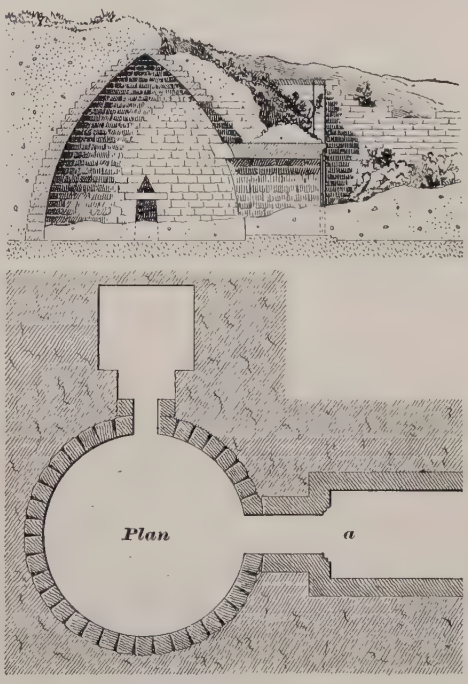


Fig. 38

62. The period which followed the Persian wars, known as the Hellenic Period, included all the principal temples and other monuments erected between the years 480 B. C. and

146 A. D., when Greece became a Roman province. The first fifty years of this period, known as the age of Pericles, was one of the most intellectual eras in the history of the world.

The architecture of the Egyptians, Assyrians, and Persians exercised very little influence on the art of the Western nations, while the influence of the Periclean period of Grecian art, pervades all subsequent architectural history.

CHARACTERISTICS

63. Greek cities were usually built on or near a fortified hill called the *acropolis*, or "upper city," and on this acropolis are usually found the principal temples and treasuries. The arrangement of the buildings on the acropolis at Athens is shown in Fig. 39. Other Greek cities of importance were Olympia, Sparta, and Delhi, in Greece proper; Pæstum, in Southern Italy; Agrigentum, in Sicily; and Ephesus and Halicarnassus in Asia Minor.

64. Greek architecture reached its full development in temples, and though we can still study the remains of theaters, circuses, market places, and tombs, it is in the Grecian temple that we find the perfection of detail that has made Greek art immortal.

The earliest temples consisted of a *naos*, or single cell, only, and were *astylar*, that is, without columns, except sometimes on the front, where a *pronaos*, or porch, was produced by continuing the side walls beyond the front wall of the naos, and placing the columns in *antis;* that is, between the two pilasters forming the ends of the projecting walls, as shown in Fig. 40 (*a*). This figure illustrates the plan of the temple, showing the naos, or sanctuary, at *a*; the pronaos, or advanced porch, at *b*; and the two columns, *in antis*, between them at *d*.

65. The arrangement of all later Greek temples was extremely simple. A platform *a*, Fig. 40 (*f*), surrounds the building on which the columns stand. The pronaos, or porch, *b*, is immediately in front of the entrance to the naos,

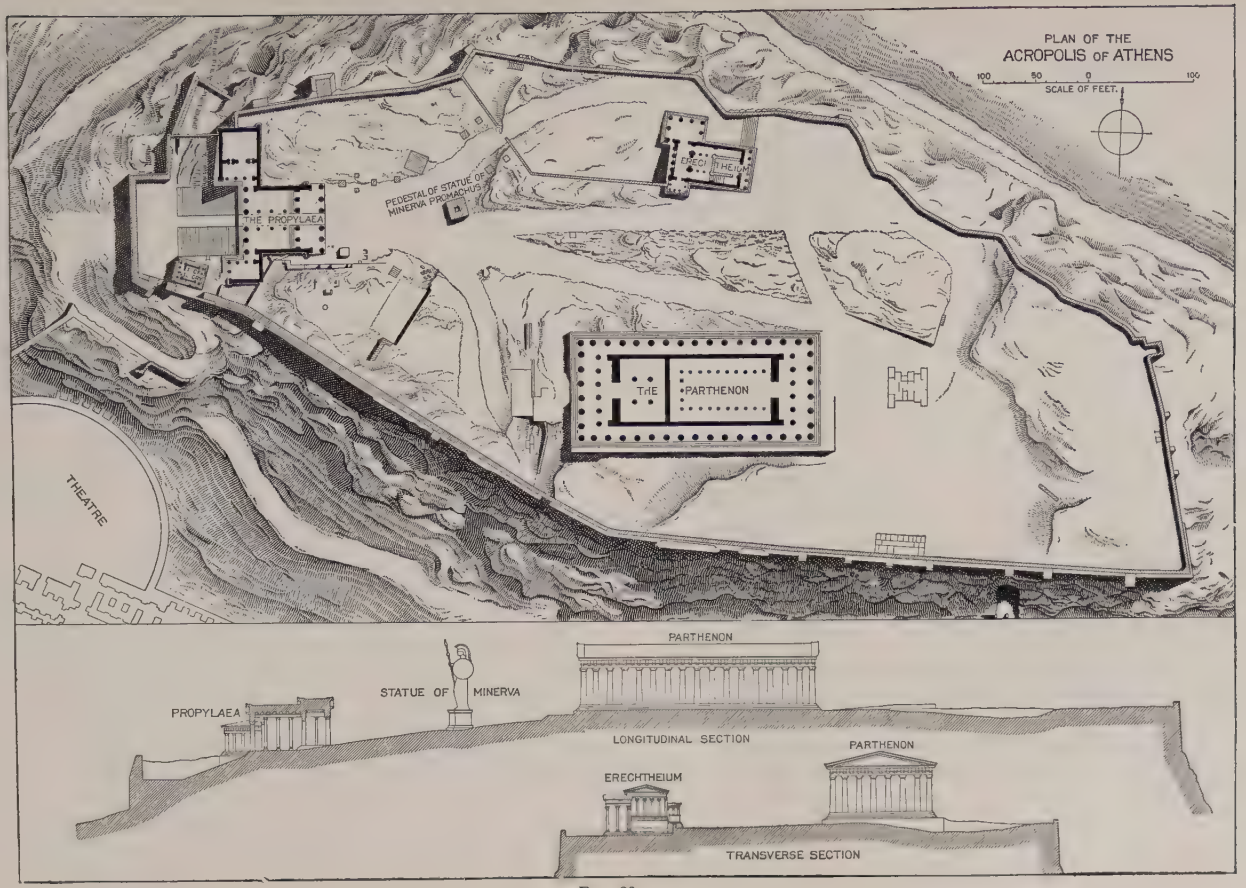

PLAN OF THE
ACROPOLIS OF ATHENS
100 50 0 100
SCALE OF FEET.
ERECTHEION
PEDESTAL OF STATUE OF
MINERVA PROMACHUS
THE PROPYLAEA
THE PARTHENON
THEATRE
PARTHENON
STATUE OF MINERVA
PROPYLAEA
LONGITUDINAL SECTION
PARTHENON
ERECHTHEIUM
TRANSVERSE SECTION

FIG. 39

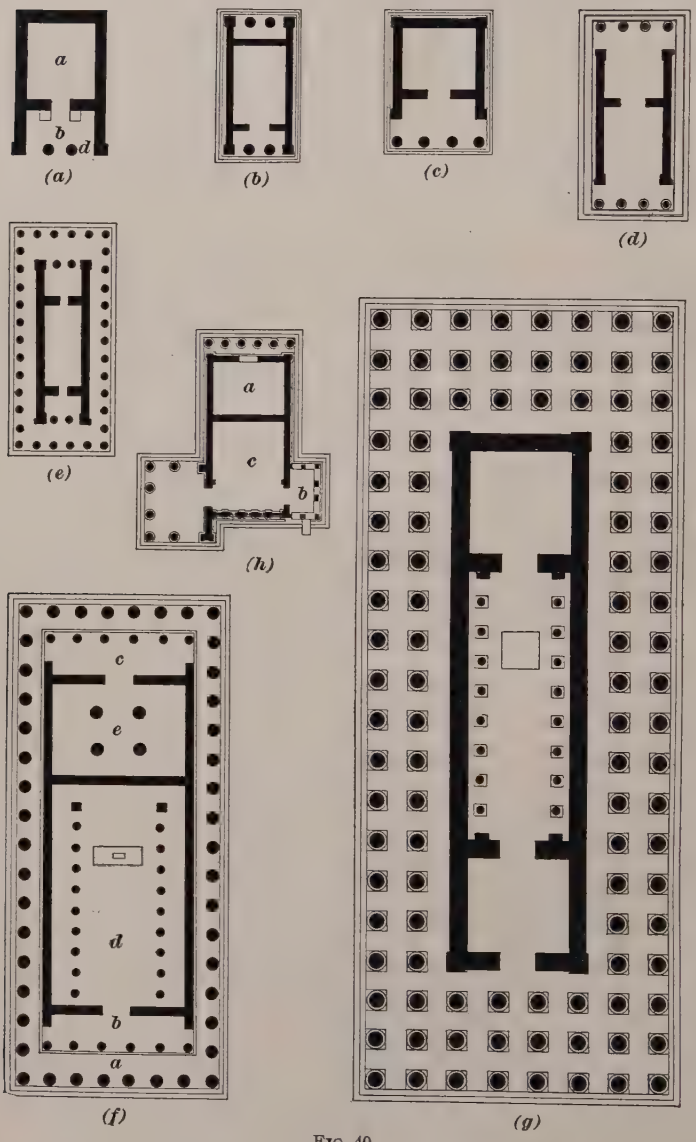


FIG. 40

or cell, *d*. At *e* is the *opisthodomus*, or treasury chamber, where the gold and silver chalices, urns, torches, and braziers, employed in various ceremonies, were stored when not in use, and at *c* is the rear porch, or *posticum*.

66. On the exterior of the temples, variety was attained by arranging the columns in one of seven distinct systems:

1. Distyle (two columns) in antis, as in Fig. 40 (*a*).
2. Distyle in antis at both ends, as in Fig. 40 (*b*).
3. Prostyle tetrastyle, that is, four columns with front portico, as in Fig. 40 (*c*).
4. Amphi prostyle tetrastyle, four columns and porticos, at each end, as in Fig. 40 (*d*).
5. Peripteral hexastyle, surrounded by columns, six on each end, as in Fig. 40 (*e*).
6. Peripteral octastyle, surrounded by columns, eight on each end, as in Fig. 40 (*f*).
7. Dipteral hexastyle, or octastyle, surrounded by two rows of columns, with six or eight at each end, as in Fig. 40 (*g*).

Circular and octagonal temples also existed, but these are rare and can be considered as exceptions to the general rule.

67. All of these temples were erected in one of three systems of architectural design, each consisting of a substructure, a column, a beam or lintel, and a superstructure. These four details are varied somewhat in different structures, but were arranged in three systems, the details of which remained almost constant in all structures where each was followed. These systems are called **architectural orders,** and are classified as the *Doric order*, the *Ionic order*, and the *Corinthian order*, being named after the section of the country where each system is supposed to have originated. In Fig. 41 are shown these three orders according to the Greek standard, the Doric being shown at (*a*), the Ionic at (*b*), and the Corinthian at (*c*). The relative proportions of the height of the column to its diameter, can be judged in each order, as the columns in Fig. 41 are all of the same thickness at the base.

FIG. 41

EXAMPLES

68. The Parthenon.—The Parthenon was a temple dedicated to Athena Parthenos (Athena the Virgin). Ictinus and Callicrates were the architects, and Phidias the superintending sculptor. The plan of this temple, Fig. 40 (*f*), shows it to be peripteral octastyle, with seventeen columns on the sides. It stood on a stylobate of three steps, the top step being 102 ft. × 228 ft.—a proportion of about 4 to 9. Each step is

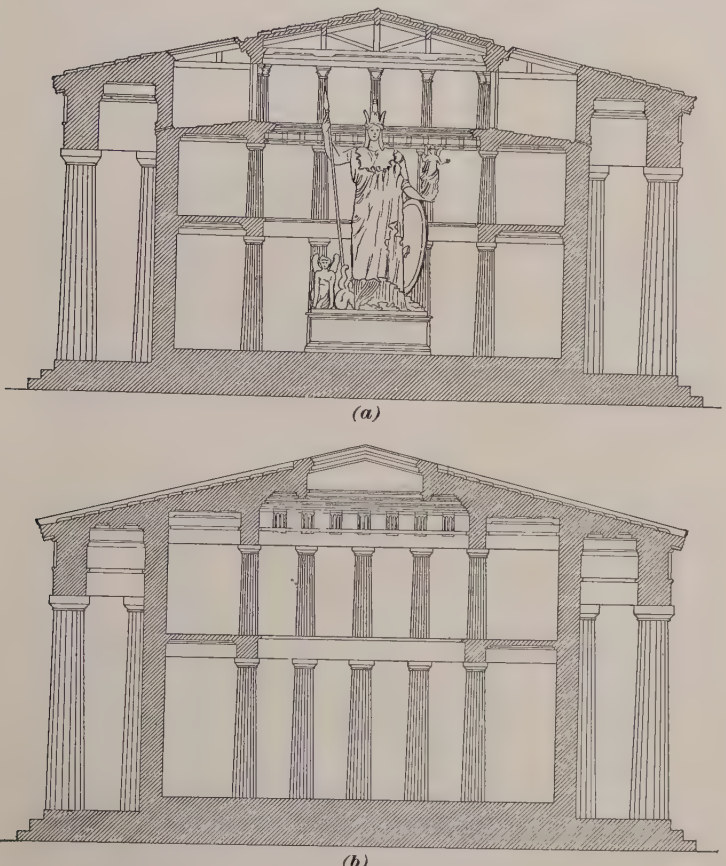
FIG. 42

1 ft. 8 in. high × 2 ft. 4 in. wide, and intermediate steps of half these dimensions are provided at the entrances.

The Doric was the order especially loved by the Greeks, and as used in the Parthenon is as complete and as perfect an architectural feature as has ever been known. Fig. 42 shows the condition of the structure as it stands today in ruins on the Acropolis at Athens, while in Fig. 43 is shown a view of the Parthenon, made from a restored model of the temple, in the Metropolitan Museum, New York. This model shows the building as completed by the architects in the year 438 B. C.

Fig. 43

69. Owing to the ruined condition of this celebrated structure, there have been several theories advanced as to how the interior was lighted. The architectural historian Ferguson maintains that this was effected by means of a clearstory, as shown in the sectional view, Fig. 44 (*a*), while



(*a*)

(*b*)

FIG. 44

Bötticher, another historian, advanced the theory of a central opening along the ridge, as shown at (*b*). Both agree upon an upper tier of interior columns, although this construction was never used on the exterior of any Greek temple.

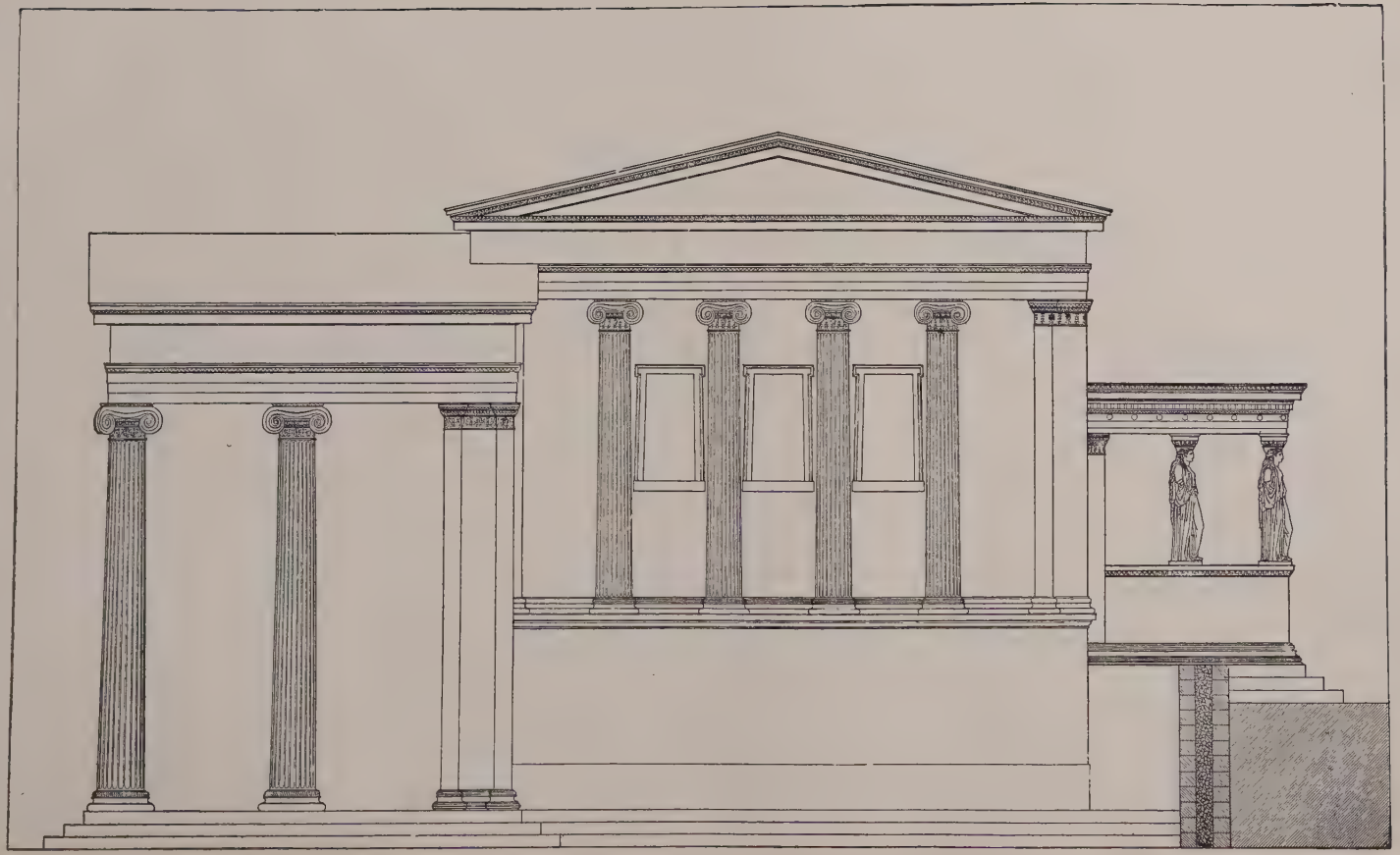


FIG. 45

Within the temple was a marvelous statue of Athena sculptured by Phidias. This statue was 40 feet in height and was composed of gold and ivory. It represented Athena in full armor, with helmet, spear, and shield, in her character as defender of the nation. The face, hands, and feet were of ivory, but the drapery and the armor were of solid gold with precious stones inserted.

70. The Erechtheum.—The principal Greek structure in the Ionic order was the Erechtheum, and consisted of a

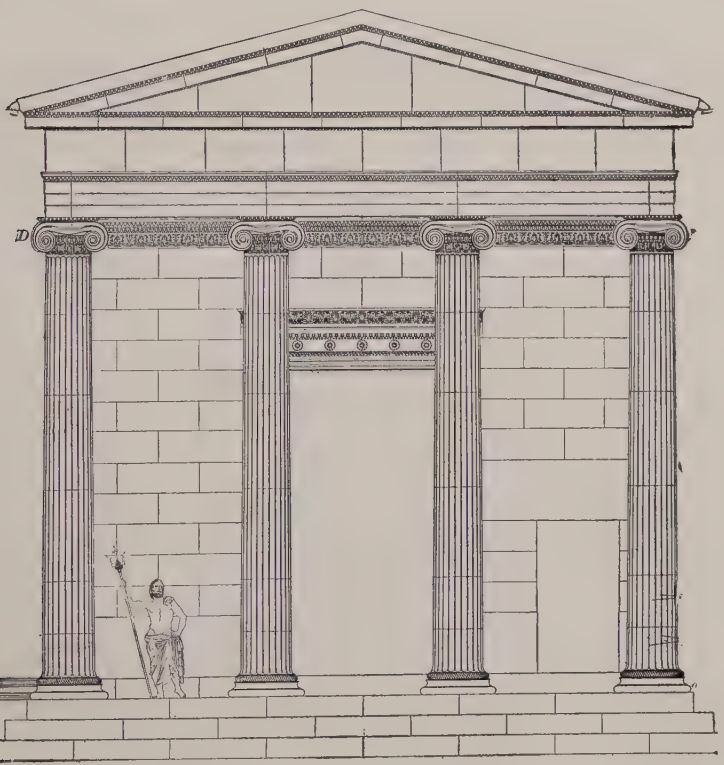


FIG. 46

triple temple, as shown in the plan, Fig. 40 (*h*), which exhibits the peculiarities of its outline. It combined three temples, that of the Greek god Erechtheus at *a*, and those of

the goddesses Pandrosus and Athena Polias at *b* and *c*, respectively. The design was intentionally unsymmetrical, not only in plan but in elevation, as shown in Fig. 45—as the three temples were on different levels—and was varied as widely in detail as circumstances would permit. The porch of the temple of Athena Polias on the north side was on the lowest level and contained six columns, four in front, as shown in Fig. 46. The temple of Erechtheus on the east side contained six columns in its porch, but they were all arranged across the front, with no extra ones at the sides.

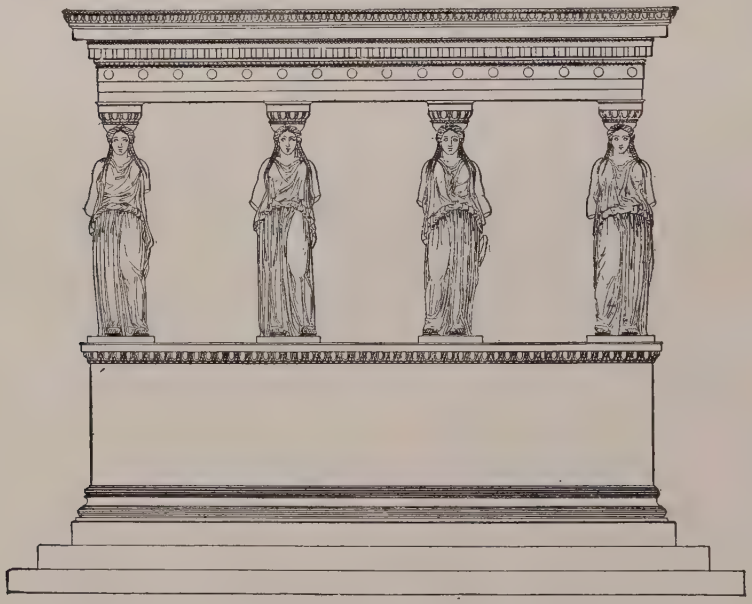


Fig. 47

In the temple of Pandrosus, the roof is not supported on columns at all, but on the heads of sculptured female figures called *caryatids*. A front elevation of this last temple is shown in Fig. 47, and a detail of one of the caryatids, in Fig. 48. As will be observed, the Grecian architect exerted every effort in his power to prevent this building from presenting the appearance of a single temple dedicated to only one god.

71. The caryatid figures, Fig. 48, in the porch of the Erectheum are unique, as there is only this one example of their use for such a purpose. The entablature they support is Ionic in detail, but the height of the figures is much less than the corresponding column would be. The figures are heavily proportioned to fulfil the demand for an appearance of strength, and the draperies are exquisitely modeled, as are all details of Greek sculpture.

Fig. 48

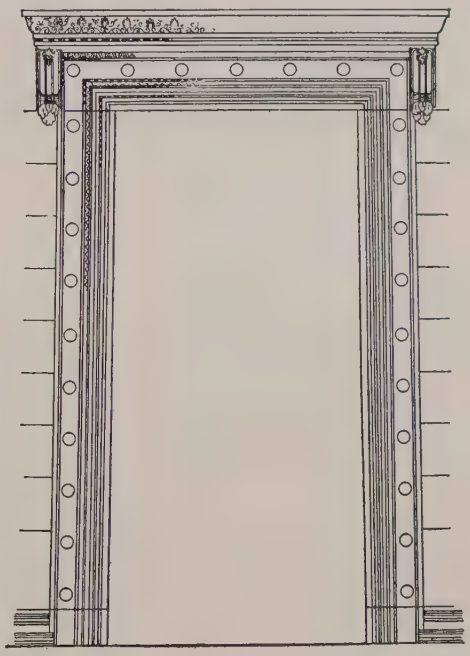


Fig. 49

72. The doorway of the temple of Athena Polias, of which the cornice only is visible in Fig. 46, is shown more in detail in Fig. 49. It is of interest because there are so few examples existing where the details of the openings can be studied. This door is a trifle more than twice as high as it

is wide, and the sides taper slightly so that the top is only about fifteen-sixteenths the width of the bottom. This diminution was undoubtedly given in order to obviate any appearance of weakness. The conventional honeysuckle ornament adorns the cyma and an egg-and-dart ornament is carved on the ovolo under the soffit of the corona (see Art. **91**). The projection of the cornice is about equal to its height, and the soffit at each end is supported by a scroll form of bracket, called a *console*.

The windows, as shown in Fig. 45, possess the same relative proportion as the doorway.

Fig. 50

73. Temple of Nike Apteros.—Another Ionic structure that was demolished and its stones built into the Acropolis walls, is the little temple of Nike Apteros, or Wingless Victory, Fig. 50. This little edifice was rescued by architectural students, however, and rebuilt in its original position on the right of the Propylæa stairs, as shown at *d*, Fig. 51. Fig. 50 shows the front elevation of the temple of Wingless Victory as it existed after the restoration. The frieze is observed to be carved with various human figures, a condition that is unusual in the Grecian-Ionic buildings.

74. The Propylæa.—Another important Doric structure is the Propylæa, or principal gateway to the Acropolis, which is shown in Fig. 51. The Acropolis of Athens was a fortified hill surrounded by a wall in which were nine gateways. The Propylæa *a* consisted of a Doric hexaprostyle portico, the central columns of which were separated more than the others in order to form a wider passageway for the religious processions. Beyond this is a vestibule divided into three

FIG. 51

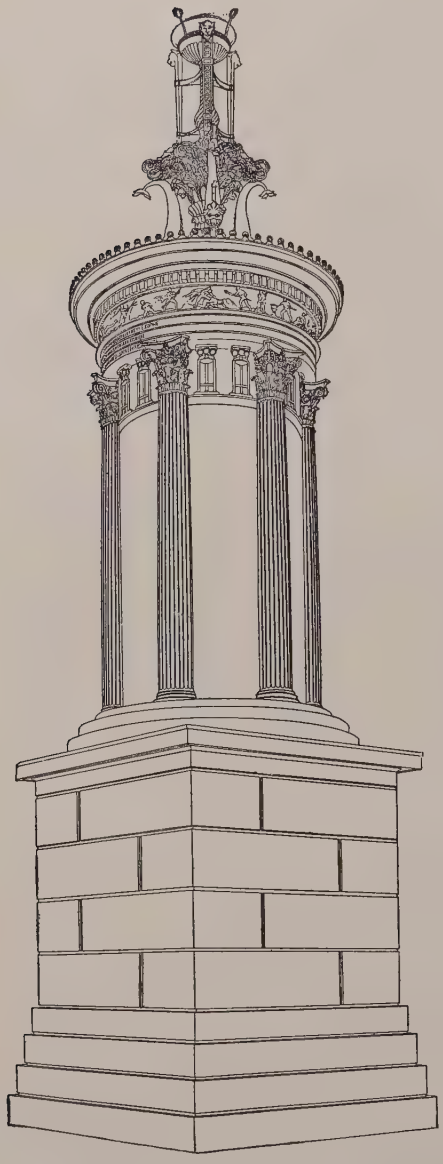


Fig. 52

parts by two rows of Ionic columns, each row of which forms the front of a small *tristyle*, or three-columned temple *in antis*, to the right and left of the vestibule, as shown at *b* and *c*.

Beyond the Propylæa, the summit of the hill was leveled off to form a plateau, and prominent on the south side at *e* stood the celebrated Parthenon. A colossal statue of Athena *f*, stood directly in front of the center of the Propylæa, and to the left of this monument and northeast of the Parthenon stood the Erechtheum, the triple Ionic temple, as shown at *g*. Smaller temples to minor deities and statues of heroes and gods were numerous along the walls of the Acropolis, and the entire plateau was laid out to make a most impressive architectural composition, worthy of the gods to whom incense was burned on the numerous altars. See also Fig. 39.

75. Choragic Monument of Lysicrates.—There is only one perfect example of the Corinthian order found in Greece at the present day, and this is the little structure known as the Choragic Monument of Lysicrates, which is shown in Fig. 52. This structure stands on a square pedestal built to receive it, and is surmounted by a bronze tripod; but these details form no part of the order itself. The stylobate in this example is circular in plan, and the columns are arranged around and against a cylinder; but these and the superstructure will be considered as though they were entirely detached, as in the previous examples. The shaft of the column is grooved by twenty-four flutes separated by fillets, as in the Ionic order, but is longer in proportion to its diameter. It also has a molded base similar to the Ionic, but this is spread more on account of the smaller sectional area of the column. The capital is taller than that of either of the other orders, and is carved in representation of foliage arranged around a bell-shaped core. The entablature is similar to that division of the Ionic order, but is much richer in moldings and carvings.

The foliage of the capital and the ornament supporting the bronze tripod above is based upon the *acanthus*—a plant growing freely in Mediterranean countries, that strongly resembles our modern thistle. The acanthus is another of those vegetable types that like the lotus became almost emblematic in itself of a particular architectural style. The Greeks used it in their decorative schemes and carried it around the bell of the capital of their Corinthian columns, thus introducing a new architectural detail—the foliated capital. The Egyptians carved and painted their capitals in conventional representation of the lotus blossom and papyrus plant, as has been shown in Fig. 14, but the Greeks went a step further, and, adopting the bell shape for the core of the capital, they embellished it with delicately arranged foliage from the acanthus plant. The Corinthian order, however, was never used by the Greeks in their temple architecture. It was used in small buildings only, and of these but few examples exist.

76. Tower of the Winds.—Another structure at Athens, the Tower of the Winds, Fig. 53, possesses a foliated capital, on its columns, but the columns have no base. The building was octagonal in plan, and on each side was carved a figure emblematic of the wind from that particular direction.

The building contained a clock operated by water-power and it was in reality more a building of public utility than

FIG. 53

an architectural monument, to be classed with the great temples of Greece. On two sides it presented projecting porches, whose roofs were closed on the outer ends with pediments supported on baseless columns. The whole trend of these Corinthian designs is directly against the architectural traditions of Greece. Neither of them is a temple, and neither of them presents a single architectural detail that can be found in the temple orders.

77. Tombs.—The tombs in Greece proper are of no great account architecturally, but in the Greek colonies there are several of great importance. The colossal Mausoleum at Halicarnassus, Fig. 54, erected to Mausolus, King of Caria, was an immense Ionic structure, 140 feet high and

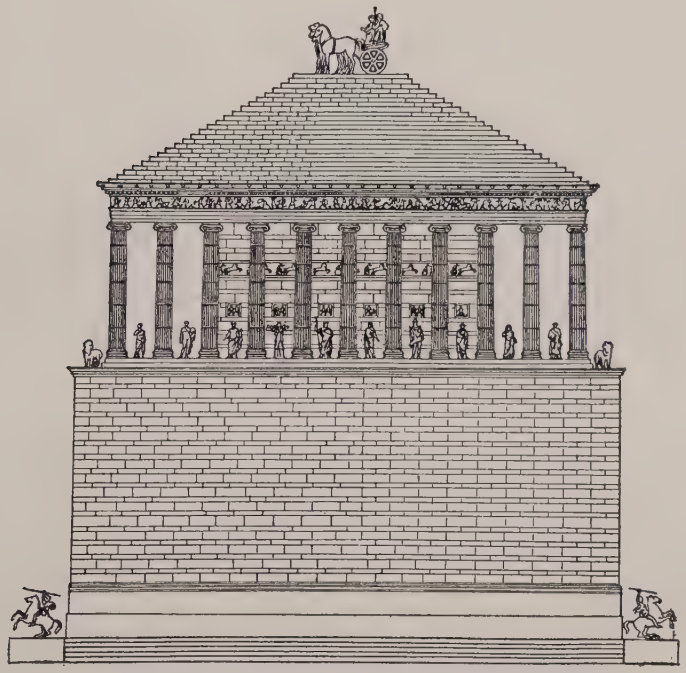


Fig. 54

115 feet square at the base. The richness of its sculpture and the beauty of its proportions made it an object of great admiration among the Greeks, by whom it was classed as one of the seven wonders of the world.

78. Theaters.—Greek theaters were interesting structures, but were entirely different from the same class of building at the present day. They were cut out of the rock on a side hill, and arranged in the form of a semicircle, with seats in rows parallel with the circumference, as shown in

Fig. 55. The stage was built across the center, back of which the scene was set, and the whole enclosure was covered with an awning, called the *velarium*, arranged to protect the spectators from the sun. The velarium was stretched from

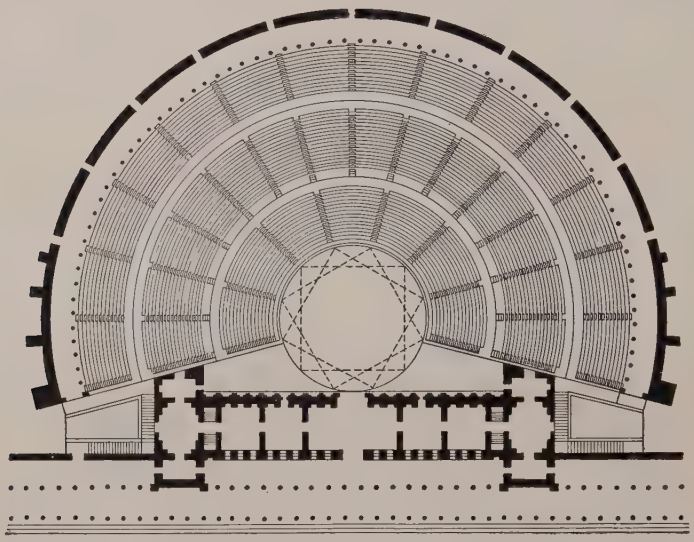


Fig. 55

the top of a row of columns, which were the only architectural feature visible from the outside of the building.

79. To the Greeks we owe the greater part of the beautiful and delicate details of columnar architecture. To them we are indebted for the most refined methods of obviating the defects of optical illusion. The apparent depression in the cornice across the front of the temples, caused by the mass of material and apparent weight in the center of the pediment, was obviated by curving the cornice so that the center was highest. The steps were curved in the same upward way. The architrave and frieze of the Parthenon sloped about 1 part in 80 toward the center; and so it was in all the minute details of construction. The Greeks not only avoided structural weakness in design, but invented methods to overcome even the slightest appearance of such weakness.

ANALYTICAL STUDY

PLANS

80. Greek temples were almost invariably rectangular in plan and symmetrical in design. The exceptions being the Erechtheum, Fig. 45, and the Propylæa, Fig. 51, which were irregular; the Choragic Monument of Lysicrates, Fig. 52, which was round; the Tower of the Winds, which was octagonal, and a few others. Contrasted with the Egyptian temples, the columns of the Greek temples are found to be entirely on the exterior and uniform in style and design in each temple.

WALLS

81. The walls were built of solid stone cut with mathematical exactness. No mortar was used, the joints being so placed as to remain tight through the force of gravitation. The finish was obtained by rubbing the surface of the finished wall with fine sand.

ROOFS

82. The roofs of the Greek temples were usually of tile laid on timber beams and extending only over a portion of the building, so as to form a central light well, as in Fig. 44 (*b*), or a clearstory, as in Fig. 44 (*a*). However, since all of these timber beams have rotted away during the intervening centuries, much controversy exists on this point owing to lack of satisfactory evidence.

COLUMNS

83. The temples being only one story high, the column and its entablature constituted the entire height of the building. These temples were in one of the three orders, except in the Propylæa, where the Ionic order was introduced in an otherwise Doric composition. In the Erechtheum, the

caryatids were used on the porch, but as this was an exceptional structure, the caryatids can be considered as an element of this exception.

84. The height of the **Grecian Doric column** is from four to six times its diameter, and it stands, without any intermediate base, immediately on the stylobate, or substructure, *a*, shown in Fig. 41 (*a*). The column is divided into two parts, the shaft and the capital, the shaft being the straight portion shown at *b*, while the capital is the cushion-shaped block *c* interposed between the shaft and the entablature, or superstructure, to receive the superimposed weight and concentrate it at the top of the column. The diameter of the shaft is less at the top than at the bottom, the diminution being effected, not in a straight line from the bottom to the top, but in a curved line that renders the face of the column slightly convex or barrel-shaped. This curved profile is called the *entasis* of the column, and its purpose is to overcome an optical illusion, which causes long, straight lines to appear hollow or concave. This curvature of outline was maintained not only in the columns, but also throughout entire buildings, and as a consequence, in Greek compositions, there is not a straight line in the entire structure. The shaft is grooved by from sixteen to twenty flutes that meet on the surface and form ridges or *arrises*, as shown at *x*.

85. The *entablature* is subdivided into three parts: the *architrave*, or lintel, *d*; the *frieze e*; and the *cornice*, or crowning member, *f*. The frieze is broken by the *triglyphs g* and the *metopes h*. The triglyphs derive their name from the grooves, or channels, cut in their faces, two being cut in the middle and half a channel being cut on each side, making in all three channels, or "glyphs," which is the meaning of the term triglyph.

The *cornice* consists of the finish along the edge of the slabs, or tiles, that form the roof covering. It formed a gutter that discharged the rainwater through numerous curved *gargoyles*, or spouts, as shown at *l*, Fig. 41 (*a*).

86. To the Greeks we are indebted for the invention of a new architectural form, the *pediment*. This exists at the ends of the temples, and is formed by the triangle under the roof slopes, Fig. 46. The upper molding of the cornice was carried across the ends of the building from each side on a line with the roof slope, while the lower member was carried straight across the ends of the building. The triangle then forms a pediment, while the surface enclosed by the moldings is called the *tympanum*. This surface was frequently decorated with sculptured figures as in the Parthenon, Fig. 42, but equally often was left perfectly plain. The soffit, or under side, of the lower member of the cornice was ornamented with a number of projecting slabs, called *mutules*, representative of the ends of the rafters in the sloping roof. These slabs were placed regularly around all four sides of the building, being centered over each triglyph and metope.

87. In the **Ionic order,** shown in Fig. 41 (*b*), the column is more slender than in the Doric, being about eight or nine times its diameter in height. Instead of being divided into two parts, the Ionic column consists of three subdivisions, the base *a*, which forms an individual substructure under each column, the shaft, or column proper, *b*, and the capital *c*, while the stylobate, on which the column stands, is practically the same as the Doric order. The shaft is grooved by twenty-four flutes that are separated by narrow fillets *e*.

The capital *c* is the distinguishing characteristic of the Ionic order. Its volutes, or spirals, suggest that its design may have been influenced by Assyrian ideas [see Fig. 33 (*c*)]. The architrave *f*, unlike that detail in the Doric order, is composed of three bands, each of which projects slightly beyond the one below. The frieze *g* in this order is a plain band unbroken by triglyphs or other details. The cornice *h* is somewhat similar to the Doric in its proportions, but differs materially in its details, and the tympanum under the pediment is not ornamented with sculpture in any of the Ionic temples, the remains of which are now in existence.

88. In the **Corinthian order,** Fig. 41 (*c*), the shaft of the column is grooved by twenty-four flutes separated by fillets, as in the Ionic order, but the column is longer in proportion to its diameter. It also has a molded base that is similar to the Ionic, but this is spread more on account of the smaller sectional area of the column. The capital is taller than that of either of the other orders, and is carved in representation of foliage arranged around a bell-shaped core, Fig. 56. The entablature is similar to that division of the Ionic order, but is much richer in moldings and carved figures.

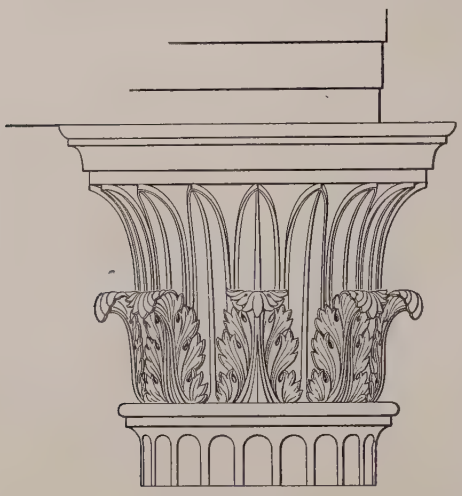


FIG. 56

OPENINGS

89. All openings in Greek structures were square-headed. The lintel alone was used to span distances between supports, as the style of architecture is a trabeated one. The openings were necessarily narrow, owing to the difficulty in obtaining stone lintels of any considerable length. The sides of the openings occasionally tapered toward the top, and they were usually relieved by an architrave at the sides and a cornice, or entablature, supported on consoles, across the top.

MOLDINGS

90. Moldings are used in architectural design to subdivide wall surfaces into smaller areas that may be treated separately. The Greeks were the first to classify their moldings systematically, and to use the combination of a few simple

forms to secure the most artistic effect. The original outlines of their moldings were probably drawn freehand, but in all cases they approximate closely to the curves of the conic sections. When they were carved or enriched, the form of decoration usually corresponded in outline to the curve of the molding itself. Thus, we find the ovolo, Fig. 57 (*g*), enriched with the "egg-and-dart" ornament, the ovolo itself having derived its name from its egg shape.

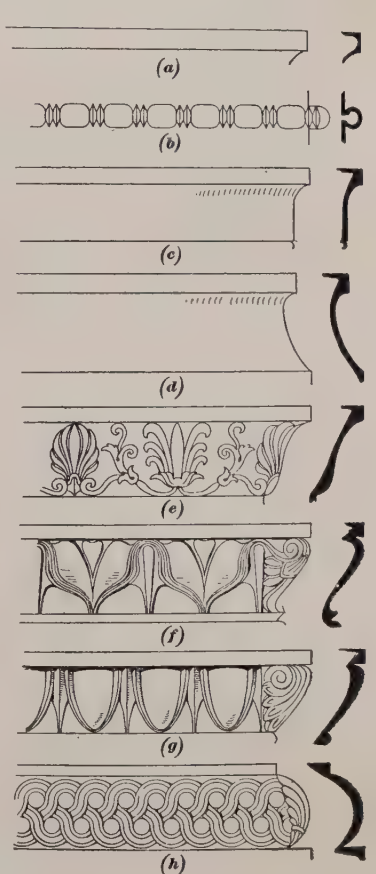


FIG. 57

91. Eight distinct moldings are found in Greek architecture, each of which is used for a particular purpose or in a distinct position. All of these moldings are used in the Ionic order, but only two of them were generally used with the Doric: the fillet (*a*) and the echinus (*f*).

1. The **fillet,** Fig. 57 (*a*), is a narrow band used to separate the members when several moldings are used in succession.

2. The **bead** (*b*) is similar to the fillet in purpose, but is round in section and frequently carved into a spindle-and-disk ornament as shown.

3. The **cavetto** is a small hollow, being almost universally used under a fillet and at the top of a plain, vertical surface, as shown at (*c*). When a hollow similar to the cavetto is used above a fillet, as at the bottom of a shaft of a column, it is called an *apophyge*, or easement.

4. The **scotia** (*d*) is a deep, hollow molding used almost exclusively in the bases of columns or other details entirely below the eye.

The two last moldings constitute all of the *hollow*, or *concave*, moldings, and in Greek architecture they were never carved or decorated in relief.

5. The **cyma recta** (*e*) is a molding of double curvature—concave above and convex beneath. Its form gives it its name, *cyma* meaning "a wave." The cyma recta was nearly always used at the top of a composition, with a fillet above and below it. It was usually decorated with the conventional honeysuckle ornament, as here shown, but in many instances was left plain.

6. The **cyma reversa** (*f*) is another molding of compound curvature, but is convex above and concave beneath. It was always used under a fillet, and when ornamented, the elements of the design were based on the profile, or curve, of the molding.

7. The **ovolo,** or **echinus,** is an egg-shaped molding (*g*) entirely convex, and its characteristic ornamentation was a carved egg-and-dart form, as shown. It is more frequently called an *egg-and-dart molding* than an ovolo.

8. The **torus** (*h*) is a large, convex molding similar to the bead, but is much larger and is used only between two fillets in the bases of columns. It was sometimes decorated with strapwork ornamentation, called a *guilloche*, as shown.

In nearly every instance, the curves of these moldings were based on the parabola, hyperbola, or ellipse, and rarely do we find the arc of a circle used. This is an important characteristic of Greek moldings.

ORNAMENT

92. Types.—The types on which Greek ornament is based are few, and the renderings are so conventional that it is difficult to recognize in many cases from what particular type the ornament was derived. The fret is used frequently, and is undoubtedly derived from an Egyptian source, as is

also much of the foliated ornament indicating a modified rendering of the conventional lotus.

93. The acanthus leaf is the first new type that is met in Greek ornament, and it appears on the Corinthian capitals and on much of the painted decoration. Fig. 58 (*a*) shows a form of the acanthus taken from the Tower of the Winds at Athens. This is a purely conventional form, possessing a broad, bold treatment necessary for its execution in stone, but it follows closely the principles of the growing plant as do all other developments in Greek ornament.

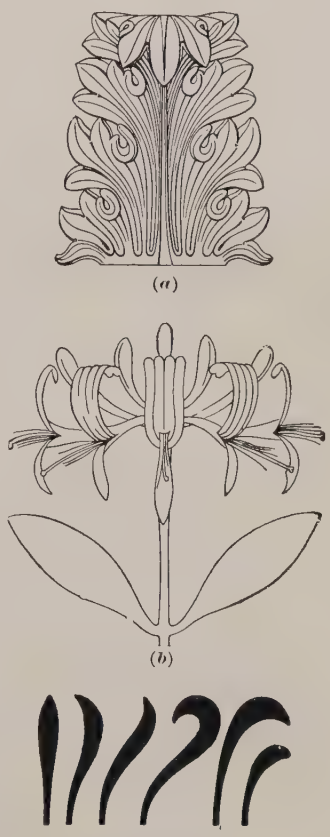
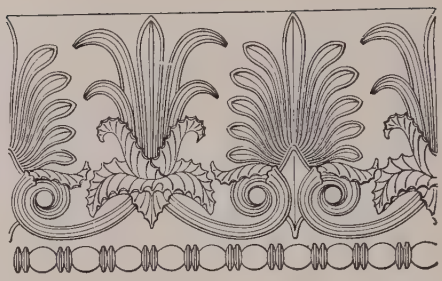


Fig. 58

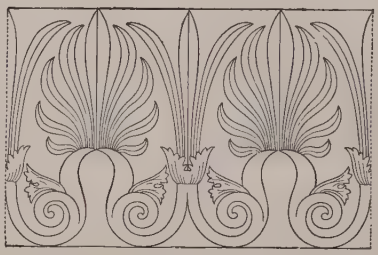
94. The Three Great Laws of Nature.—That the Greek artists carefully observed the principle on which certain plants grew, and carried that principle out conscientiously in the execution of their designs, cannot be doubted. They were close observers of nature, and although they did not copy nor attempt to imitate or make true portraits of any natural forms, they never violated a natural principle. The three great laws of nature—*radiation from the parent stem, the proportionate distribution of areas, and the tangential curvature of the lines*—are always obeyed; and it is the unerring perfection with which they are carried out in the most humble works, as well as those of the greatest importance, that fills us with astonishment at the conscientious scruples of the Greek artist.

(*a*)

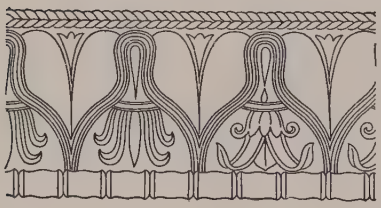


(*b*)

(*c*)



(*d*)



(*e*)

(*f*)

(*g*)

FIG. 59

95. Various Forms of Greek Ornament.—The forms shown in Fig. 59 (*a*), (*b*), (*c*), and (*d*) are usually referred to

Fig. 60

as the **honeysuckle ornament,** although there is much question as to whether these forms were derived from the

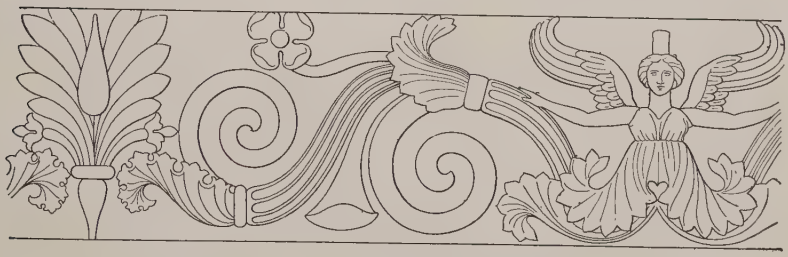
conventional rendering of the honeysuckle bud, or from an adoption of certain lotus forms in single brush strokes. The natural honeysuckle blossom is shown in Fig. 60, and a strictly conventional rendering of it, in Fig. 58 (*b*). It requires some imagination to believe that the graceful strokes of the honeysuckle ornament bear any relation to the plant itself, and it is far easier to assume that these are the outcome of brush-stroke renderings of lotus forms. In Fig. 58 (*c*) are shown six strokes made with a brush and black paint. The point of the brush is first touched to the paper, and as pressure is increased, the bristles spread out and then come together again when the pressure is released, thus giving the stroke the forms shown. Variations of these six strokes constitute the principal elements of all painted Greek ornament and some carved ornament. The influence of this stroke is particularly traceable in Fig. 59 (*a*), (*b*), (*c*), and (*d*), and will be found also in subsequent examples.

96. In order to supply *motifs* for the graceful scrolls that appear so frequently in Greek designs, the artist did not hesitate to draw inspirations from such homely growths as pumpkin and squash vines, the details of which were conventionalized into the forms shown in Fig. 61. These vine forms were sometimes combined with other forms, such as the acanthus leaf, as shown in Fig. 61 (*a*), with the honeysuckle ornament, as at (*b*) and (*d*), or the human figure, as at (*c*). Variations were practiced to suit the conditions of each case, as in Fig. 59 (*e*), where the outlines of the ornament show it to have been carved on a cyma-reversa molding. In Fig. 64 are shown four examples, introducing individual ornaments in *alternation;* that is, two forms repeated alternately in contrast to *repetition*, where one form is repeated continuously, as in Fig. 59 (*c*) and (*e*).

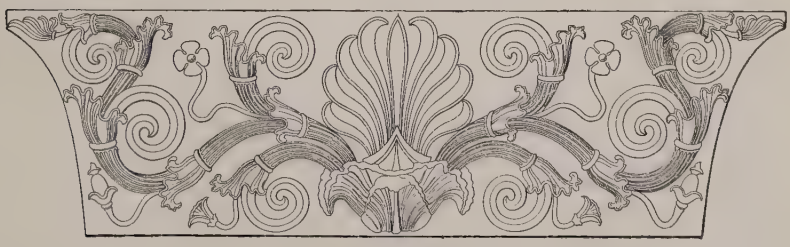
The scroll shown in Fig. 59 (*g*) is taken from the top of the Choragic Monument of Lysicrates and presents the characteristic principles of Greek scroll ornament. There is a main central wavy line or stem here, from which the scrolls branch off alternately from opposite sides.

(*a*)

(*b*)



(*c*)



(*d*)

FIG. 61

The forms in Fig. 65 are known as *stellæ*, and were used largely on tops of tomb monuments. The forms at (*a*), (*b*), (*c*), and (*d*) were used on corners, and the forms (*e*), (*f*), and (*g*) as central ornaments. Although these examples

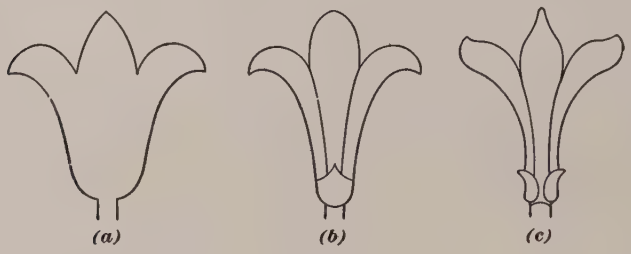


Fig. 62

were all originally executed in stone, the graceful form of the brush-stroke is evident in all of them except (*d*).

The same may be said of the **Greek lily**, Fig. 62 (*c*), which may have been derived from the lotus form (*a*) and (*b*). The **anthemion ornament**, Fig. 63, consists of the honeysuckle form enclosed in an elliptical outline. This was much used to decorate the antefixæ along the eaves, and also for the stellæ on the tops of monuments and at the points of pediments.

In Fig. 66 are shown examples of Greek ornament found on painted vases. At (*a*) is shown the honeysuckle ornament alternated with a simple form of the Greek lily; at (*b*), the anthemion designed to form a border, or stripe; at (*c*) and (*d*), rosette forms, which may have been borrowed from Egypt, as may also the wave design shown at (*g*). The fret forms at (*e*) and (*f*) are characteristic of Greek geometrical ornament. The fret is one of the most ancient forms of ornament known. It was probably derived from patterns formed by laying bricks in two colors. In the best patterns,

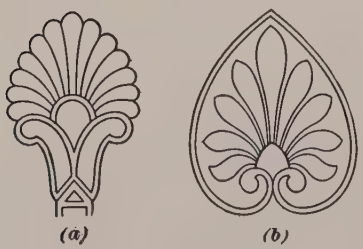


Fig. 63

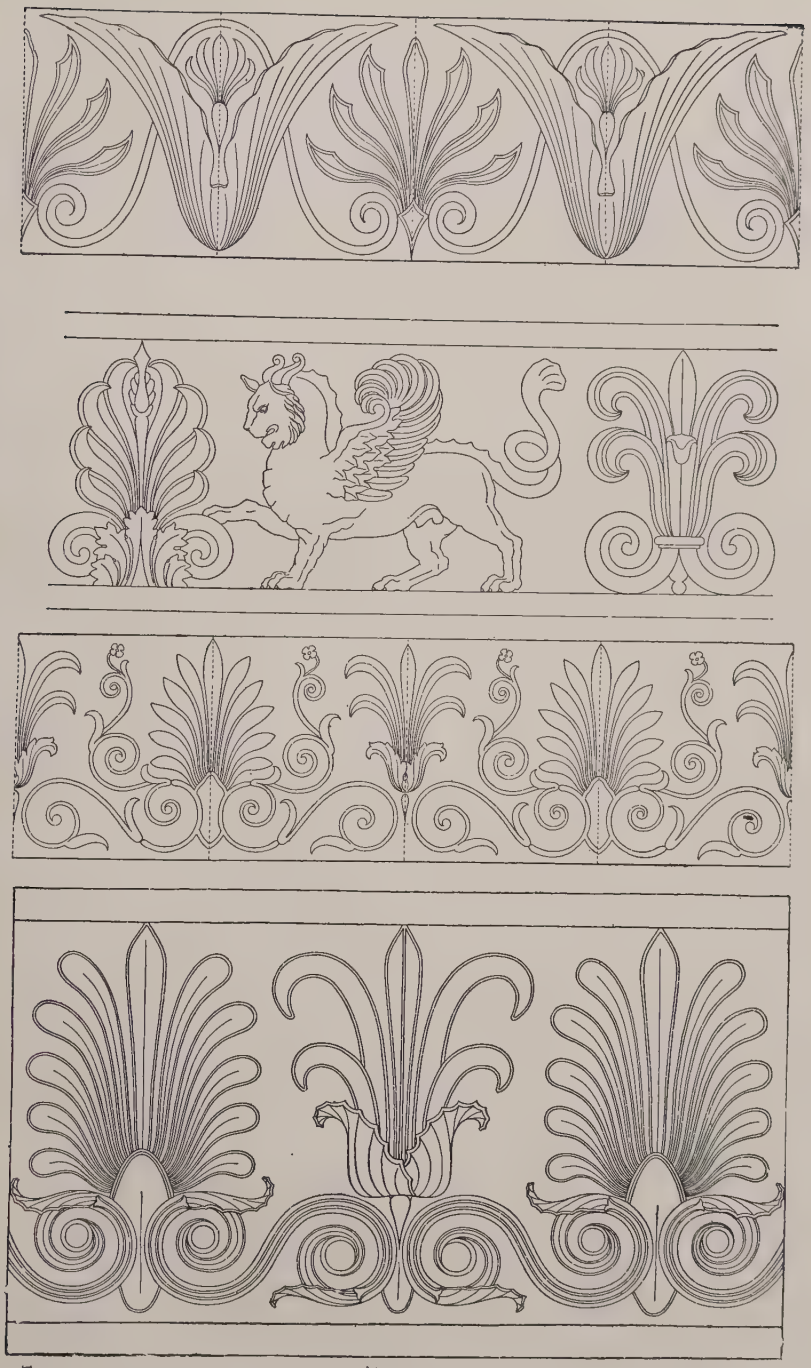
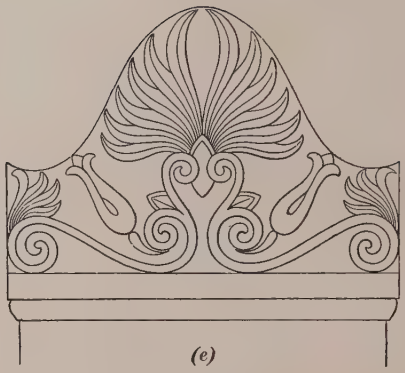


FIG. 61

(a)

(b)

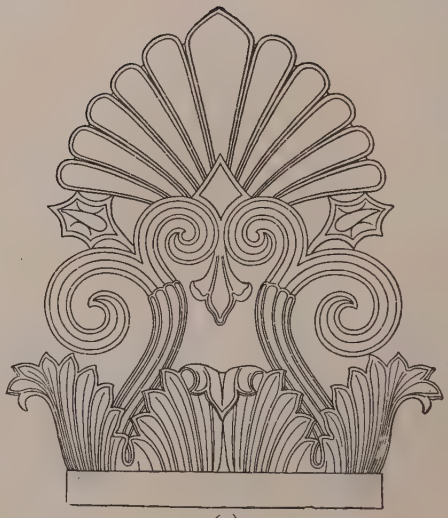


(e)

(c)

(d)

(f)



(g)

FIG. 65

(a)

(b)

(c)

(d)

(e)

(f)

(g)

FIG. 66

(a)

(b)

(c)

(d)

(e)

(f)

FIG. 67

the two outlines formed by the two colors are identical and fit one within the other.

In Fig. 67 (*a*) is shown a painted stellæ; at (*b*) and (*f*) colored borders, introducing the honeysuckle ornament; and at (*c*) and (*d*), ceiling ornamentation from the Parthenon. At (*e*) is shown the carved torus molding from the Ionic order, showing colors used on that member when buildings were painted.

97. The introduction of animals and human figures in ornament was very common in late Greek ornament, and

Fig. 68

even some of the foliations terminated in the human form, as shown in Fig. 68. These forms were introduced solely for decorative effect, and should not be confused with the forms that were carved on the metopes in the Doric order, or on the frieze in the Corinthian order. The latter forms were used not only for decorative effect, but also to state a historical fact, much in the same manner as the hieroglyphs were used in Egypt.

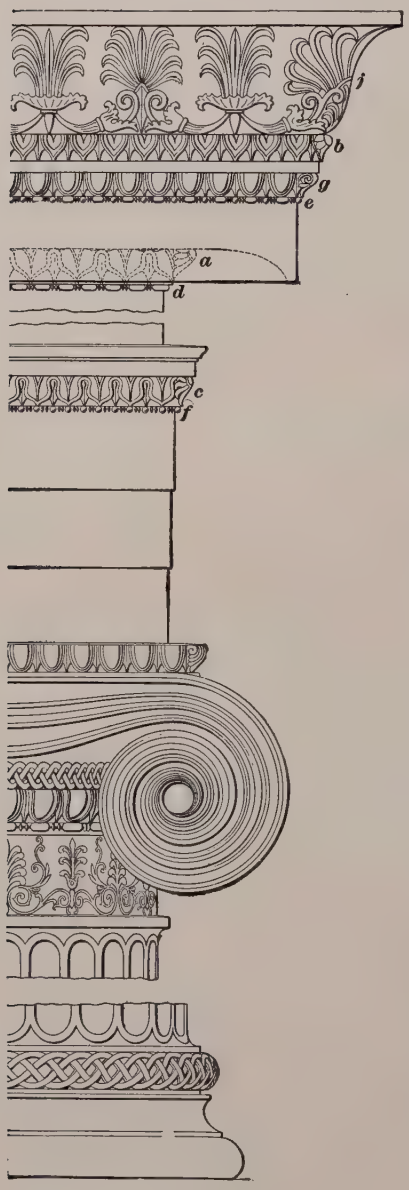


FIG. 69

98. The moldings of the Greek temples were nearly always decorated. In the Ionic order, the decoration was carved in low relief, each detail being most minutely executed, as shown in Fig. 69; whereas, in the Doric order, the decorations were painted but with equal care, as shown in Fig. 70. In each case, the character and outline of the ornament was carefully adjusted to the molding that it occupied. It will be observed, however, that straight, flat surfaces, as the abacus of the columns and the fillets, are decorated with geometrical ornament and frets, whereas the curved surfaces are decorated with various curved forms of honeysuckle ornament, egg-and-dart moldings, etc., the curve of the molding nearly always supplying the motif for the outline of the ornament in the decoration.

The guilloche was rarely used except on the upper torus of the attic base, as shown in Fig. 69. It represented a braided band of straps, and was appropriate to this position, as it

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FIG. 70

ostensibly gave strength to the base of the column that it encircled. Between the straps, buttons were sometimes carved, as shown in Fig. 67 (*e*), and a great variety of form was carried through the interlacings and the bands themselves.

99. Greek art carried the perfection of pure form to a point that has never since been reached, and the abundant remains of Greek ornament compel us to believe that refined taste was universal, and that the country was overflowing with skilled hands and minds so trained as to enable them to execute these beautiful ornaments with unerring precision and truth.

The beauty of Greek ornament, however, lies almost exclusively in its *symmetry* and *form*. It is lacking in one of the greatest charms that should always accompany ornament, namely, *symbolism;* and, despite the pleasure experienced in its beautiful gradations of form and color, Greek ornament is meaningless, purely decorative, never representative, and in few cases, in the stricter sense, hardly even constructive.

REVIEW EXERCISES

1. To what geological influence did Greece owe much for the artistic development of its architecture?

2. What is the most artistic period of Greek history?

3. What were the characteristics of the Greeks?

4. What are the principal Greek cities in which they erected architectural monuments of importance?

5. (*a*) In what class of buildings did Greek architecture reach its fullest development? (*b*) Which was the most important building?

6. What are the orders? Describe each.

7. What are moldings? Describe each of the Greek moldings.

8. On a sheet of paper 9 in. × 12 in: (*a*) Design, in color, a border composed of the honeysuckle ornament or anthemion, or both, the design to be 8 inches long and 2 inches high. (*b*) Draw a border similar to the one at the bottom of Fig. 64 and color it in accordance with the Greek idea. This design should be 2 inches high and 8 inches long. (*c*) Design two tiles in Greek coloring, each to be 3 inches square. Each of these designs may be executed on a separate sheet of drawing paper if desired.

ROMAN ARCHITECTURE

(343 B. C. TO 313 A. D.)

INFLUENCES

100. Geographical.—Italy is the central one of the three great peninsulas of Southern Europe, Fig. 71. It is about 700 miles in length, and is separated from the main land on the north by the Tyrolean Mountains. On the other three sides it is surrounded by the Mediterranean and Adriatic seas.

From the map it will be observed that although the peninsula of Italy is long and narrow, the coast is not nearly so broken up into bays and natural harbors as the coast of Greece, and that although the Apennine Mountains run from one end of the peninsula to the other, the land is not like Greece, divided into numerous valleys. Therefore, we at once come to the conclusion that the people that grew up under these two influences were somewhat strongly contrasted. The Romans were not a seafaring people; the Greeks were. The Romans therefore did not colonize in other parts of the world in the same manner as did the Greeks. In the early period, there were no rival cities as in Greece, and since no petty jealousies existed between the smaller towns, the Roman power grew up in a unit by the absorption of smaller states, which was never accomplished by either Athens or Sparta.

101. Geological.—The principal building material in Greece was marble, but in Italy there was not only an abundance of marble, but terra cotta, brick, and granite and other stone were in use all over the country, while individual localities produced a local stone that in many places characterized an architectural development. There was a very hard limestone, tripoli, or travertin; tufa, a volcanic substance

ATLANTIC OCEAN
CALEDONIA
HIBERNIA
BRITANNIA
NORWAY
SWEDEN
GERMANIA
Paris
GALLIA
ALPS
Tyrolean Mts
PYRENEES
HISPANIA
Ravenna
ADRIATIC SEA
ITALIA
DANUBE R.
BLACK SEA
THRACE
MACEDONIA
Constantinople
Nicomedia
ASIA MINOR
GREECE
Athens
Sardinia
Corsica
Sicily
MEDITERRANEAN SEA
AFRICA
EGYPT
PALESTINE
ARABIA

FIG. 71

from the hills about Rome; and peperino, a volcanic stone from Mt. Albano. Besides these, there was an abundance of lava on all sides, excellent sand and gravel, and a peculiar clean, sandy earth found in the district near Rome. This earth when mixed with lime and formed into concrete possessed extraordinary qualities of strength and durability. The walls of Roman buildings were frequently formed of concrete and afterwards overlaid with brick, cut stone, or elaborate and expensive marbles, alabasters, and porphyries from Oriental quarries.

It should be borne in mind that the Roman Empire spread over the entire known world, and as it spread its architecture was influenced by the materials found in various localities where it planted itself. However, the general system of building with concrete and finishing with stone or brick as an exterior material, was a favorite method throughout. In some Oriental cities, such as at Palmyra and Balbek, and in Egypt, stones of enormous size were quarried and used in the buildings locally.

102. Climatic.—The central and southern portions of Italy are sunny and agreeable, and the south is almost tropical. The north is temperate, and in some sections experiences severe cold in winter. On this account, the character of the buildings varies somewhat from one end of the peninsula to the other.

103. Religious.—Ancient Rome was a heathen country, and the worship of the gods was looked on as a part of the constitution of the state. On this account, the emperor was looked on as a person of divine origin, and the temple architecture of the period assumed an imperial appearance, entirely in contrast with the solemn dignity of the Egyptian and Greek temples.

104. Political.—In the earliest period of its history, Italy was occupied by three races. In the northern part, on both sides of the river Po, were the Gauls, a people that did not take part in Roman affairs until a later period. In the central portion, extending from the Arno River to Rome,

were the Etruscans, a people of obscure origin, but of high civilization, who were skilled builders and craftsmen. The religion of the Etruscans was strange and gloomy, but their engineering achievements in the construction of vaults and tombs influenced the architecture of future Rome. In Southern Italy, there were many colonies planted by the Greeks, and these were all included under the name of Magna-Græcia. The form of Roman government was similar to that of Greece; that is, the towns and districts were joined together in a league for mutual protection. The government of Rome was first conducted under a king chosen by the people, and he was assisted by one senator and a popular assembly. In 500 B. C., Rome became a republic, and in 27 B. C. it evolved into an empire. Under Augustus, Nero, and Trajan, building acts were passed that had material influence in the architectural development of the city.

105. Historical.—The history of the Romans is the history of the last of the great people of antiquity. In the 8th century before the Christian era, this great nation had its beginning in a small village, and it subsequently developed until, at the end of the 2d century, A. D., it possessed a vast empire covering the entire civilized world. Although Rome is supposed to have been founded about 750 B. C., the exact date is uncertain, as the republic was engaged in many wars and absorbed most of the Etruscan cities. Rome was defeated about 390 B. C. by the Gauls, who continued to hold Northern Italy. About 343 B. C., however, Rome began a series of wars that lasted 60 years and resulted in the city of Rome conquering the entire country of Italy and in the domination of one city over all. Then came a series of wars with people outside of Italy, and in 241 B. C., Sicily became the first Roman province. In 146 B. C., Carthage, in Northern Africa, was destroyed by the Romans, and this territory became another Roman province. About the same time, Macedonia and Greece fell into Roman hands, and with the fall of Greece in 146 B. C. began the importation of Greek artists and works of art. The Greek Empire had then spread to

Western Asia, but it became a Roman province in 133 B. C. In 55 B. C., Cæsar crossed into Britain.

In the meantime, civil wars were breaking out near the city of Rome itself. The difficulty of governing so many distant provinces under the old system of a seat of government at Rome made the adoption of an empire a necessity, and in the year 27 B. C., Augustus Cæsar was made emperor of Rome and he ruled until his death in 41 A. D. The reign of Augustus was one of the greatest eras in the world's history. It has only two parallel periods in modern times, one of these being the reign of Elizabeth in England and the other in the 19th century, during which great political and commercial developments were recorded. During the age of Augustus, the poets Virgil, Horace, and Ovid, and the historian Livy, were contemporaries. After Augustus came a long line of emperors, of whom Nero, Vespasian, and Trajan all erected buildings that characterized their reign. Under Hadrian, in 138 A. D., the empire expanded to its greatest extent. Following Hadrian came Septimius Severus, Caracalla, and Diocletian, who were the most active emperors in the architectural development of Rome.

Italy ceased farming and cultivation, and depended on imported products. The immense armies required on every frontier necessarily dominated the policy of the government. Emperors were murdered shortly after their election, and chaos set in that weakened the fabric of the great empire. Architecture being neglected, it naturally fell into decay, and until the time of Constantine nothing was done for its revival. About 313 A. D., this emperor issued a decree, called the "Edict of Milan," in which Christianity was accorded the same rights as the official Roman religion, and in 323 A. D. he himself professed Christianity, which then became the official religion of the Roman empire.

106. Social.—The social customs of the Romans materially influenced their architecture as did also the customs of the Greeks and other nations, but from this time forward, as will be observed, the architectural development reflects the

manners and customs more clearly. Therefore, it is found necessary to take this social influence into consideration, as many customs of the present day have been handed down from the early Roman times.

The earliest Romans were a simple people and lived chiefly on bread and herbs, but after their conquests, wealth was acquired and the desire for luxury invaded all ranks. Oriental customs were imitated, and the dignity of the ancient Romans was gradually displaced by social gatherings in which intemperance, gluttony, and debauchery were the leading characteristics. The Roman usually had three meals a day, with the principal meal in the evening, corresponding very closely to the modern way of living. The evening meal was elaborate and consisted of many courses, the variety of which was unlimited. The first courses were followed by elaborate dessert courses, such as pastry and fruit, while liberal quantities of wine were consumed throughout the meal.

The Romans reclined on couches as they ate their meals, the couches being arranged on three sides of a square, so that the slaves could enter on the fourth side to place and remove the dishes. The middle couch was the place of honor. No table cloths were used, but each guest brought with him a napkin that he tied over his breast. Knives and forks were unknown; two spoons were used at each meal. The feasts were usually illuminated by oil lamps, which were exquisite pieces of workmanship in bronze and silver, but the functions were greatly marred by the oil dripping on and soaking the table, while the thick, black smoke curled up and discolored the walls and rested in flakes of soot on the clothing of the guests.

107. The Romans spent much of their time in their large and elaborate baths. A cold plunge in the river Tiber, which served its purpose with the early Romans, gave place under the empire to the most luxurious and elaborate system of hot baths that the world has ever known. The Romans visited their baths as they would their clubs, and took the dip six or eight times a day. The theater, with tragedies

and comedies, the circus and the amphitheater, with their brutal exhibitions, formed the principal amusements. At the circus, they bet on their favorite horses or charioteers, the same as is done in modern times. At the amphitheater, they reveled in the bloody combats of gladiators and beasts, the most brutal of all historical pastimes. Captives, condemned slaves, or convicted criminals were given a chance to save their lives by fighting with another of the same sort. Desperately would these men fight over sand that had grown red with the blood of their fellow men and their own, but with parched lips and aching hearts they fought on knowing that a brave fight would likely win freedom. Combats of gladiators, or professional fighters, were styled feasts, and at times whole armies of them fought at once. When Emperor Trajan returned from his triumph in Asia Minor ten thousand gladiators fought in the arena at one time.

108. The household work was done by various classes of slaves. In the earliest times, a few were sufficient, but during the empire, a separate slave was provided for each piece of work. There were slaves not only to manage the household and to take care of the wine cellars, the bedrooms, the kitchen, etc., but there were slaves to carry the litter and attend to their masters. Some were readers, some were secretaries, some were physicians; others were retained solely for amusement, as dancers and jesters. All of them were ranked under two heads: bought slaves and inborn slaves. There was a slave market in which the more common slaves were bought and sold like cattle, but the more valuable were disposed of by private sale.

CHARACTERISTICS

109. With Roman architecture, the study of ancient architecture ends and that of modern architecture begins. The Roman style of design has been used in modified form throughout all subsequent eras, except the epoch known as the *Middle Ages*, which gave birth to a new style. It will be well to bear in mind all the details that characterize the Greek temples and tombs when following the thread of architectural history through the expansion of the Roman empire. The Romans introduced the arch as an architectural detail, and combined it with the column and beam of the Greek style, thereby giving rise to new architectural forms and practically to new forms of the orders themselves.

As Greek architecture is characteristically a trabeated style, so is Roman architecture characteristically an arcuated style. But there is one great difference in the general character of the two styles. The Greek buildings were simply ornamented construction, the entire system consisting of columns and beams decorated to give architectural character to the building. On the other hand, in the Roman style, the column and the beam played no part in the construction, but served simply as ornament. The walls were built either of concrete or of heavy stone blocks. The apartments were covered over with vaults, and the building could be completed practically in this rough state. The piers that supported the vaults were ornamented by columns placed against them, and the courses between different stories were emphasized by entablatures corresponding to the orders beneath. The semicircular openings that marked the end of a vault were decorated by planting around them a portion of the architectural entablature of the order in which it was found. These buildings could have been stripped of their architectural decoration—their columns, entablatures, and pediments—and structurally they would scarcely have been impaired and no doubt would have been equally as serviceable as before. Strip a Greek building of any of its architectural decorations, and the building itself is destroyed.

As the style proceeds, the arch used only as a decorative feature finally assumes a more structural form, and in some of the basilicas it is found spanning spaces between a series of columns on either side of the aisles. From this isolated position its influence can be traced in the establishment of characteristic forms in the great Gothic cathedrals of the middle ages.

110. Greek architecture was confined almost exclusively to temples and tombs; whereas, Roman architectural constructions consist of baths, amphitheaters, aqueducts, bridges, tombs, basilicas, or courts of justice, fora, or open markets, and triumphal arches—all tending to show Rome's greatness, engineering ability, and skill in using materials at hand with the best possible results.

The refined Greek system of building with large blocks of finely cut stone without mortar was set aside for a more economical system by the practical Roman. The large blocks of stone were used for carved decorations and ostentatious display on the outside of buildings, while the small pieces and fragments from the quarry were mixed with lime mortar and made into concrete for wall construction. Since broken-stone concrete could be made in any country and was easily worked under the direction of a general superintendent, Roman buildings presented a similarity in appearance, no matter whether they were erected in Southern Italy or in Northern Europe. Buildings of this character required only rough labor of the cheapest kind, and any one quite unused to the art of building could be pressed into service. The Romans therefore called on slaves and local subjects that were liable to labor for the state, and even men from the army were pressed into service. The punishment of criminals in many instances included their condemnation to work on public buildings. Thus, we find a condition of affairs that would easily enable the Romans to erect the mighty structures that they did throughout the length and breadth of the empire. Roman ruins in western Europe affected subsequent architecture from Spain to England.

111. One of the strongest characteristics in Roman construction was the use of the vault. All openings and passageways were covered with some form of this device, and a certain freedom of planning was the result. There were no restrictions as to the size or shape of a room that could be covered with some sort of vault. There were three general forms of vault used for this purpose: the *semicircular*, or *barrel*, *vault*, the *cross-vault*, and the *dome*. The first was constructed by simply laying a wooden semicylinder on top of the walls and laying over it concrete of the required thickness. When the concrete had hardened the semicylinder was removed, and the vault remained a part of the walls themselves, as shown in Fig. 72. The cross-vault consisted of two intersecting cylinders placed at right angles to each other, thus permitting columns to be used in the support under their four groins, or corners, as in Fig. 73, instead of long walls, as in Fig. 72. This permitted long compartments to be covered by a series of vaults supported by intermediate columns. Circular structures were usually covered by domes that were hemispherical in form. These were constructed by laying concrete over a wooden hemisphere that was supported on the circular wall to be roofed.

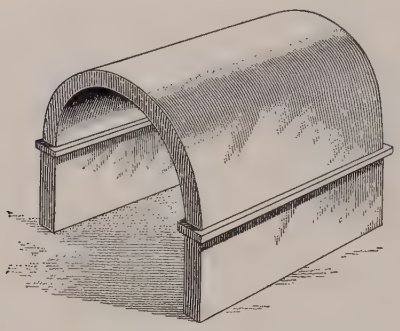


Fig. 72

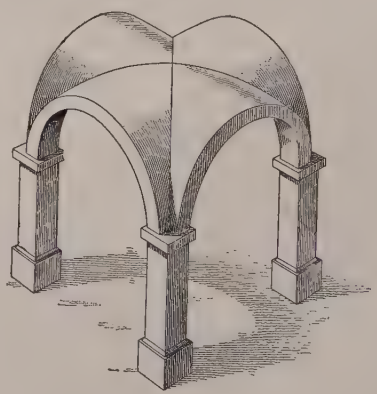


Fig. 73

EXAMPLES

112. Fora.—The **forum** was an open space in the central portion of the city, and was used as a public market or a meeting place for political gatherings. It corresponded closely to some of the public squares or small parks in a modern city. The forum was usually surrounded by elaborate architectural constructions, such as colonnades, public buildings, temples, basilicas, and statues of great men. Rome possessed several fora. As will be observed from the above description, the forum probably consisted more of a group of architectural buildings than of any single architectural detail.

113. Temples.—Roman temples were the result of building from models furnished by Greece with materials and methods used in Rome. The characteristic Roman temple was pseudo, or falsely, peripteral. It had no side colonnades, as in the more important Greek temples, but the *order* of the temple appeared on the sides in the form of attached columns, or pilasters, Fig. 74, while the porch extended in front only, Fig. 75. Steps at the front descended between projecting walls, and these often formed a pedestal for statuary. This pedestal was frequently carried out in detail around the entire building, and was termed a *podium*. Roman temples differed in proportion from Greek temples, the latter being usually about twice as long as they were wide, while the Roman temples were much shorter. The size of the cella was usually increased to the whole width of the temple, and was generally used as a museum for statuary, or as a treasury. There are also numerous examples of circular and octagonal temples. See Fig. 76.

114. Among the rectangular examples found in Rome is the Temple of Fortuna Virilis, Fig. 74, which was erected in 100 B. C. This is a typical Roman temple in plan, being pseudoperipteral, Ionic tetrastyle. Another example of rectangular architecture is the Corinthian Temple of Antoninus and Faustina, at Rome, which was erected 141 A. D. It is

pseudoperipteral and prostyle hexastyle, and is now used as the Church of St. Lorenzo. In France, at Nîmes, there is another Corinthian temple, Fig. 75, now popularly known

Fig. 74

as the Maison-Carree, or square house. This structure was erected in 138 A. D., during the reign of Hadrian, and is the best preserved Roman temple in existence. The entablatures were richly carved, and statues originally

Fig. 75

FIG. 76

Fig. 77

ornamented the pedestals in front. These are typical rectangular temples that remain today, to show us the general character of Roman structures.

115. Of the circular temples remaining, we have the Temple of Mater-Matula, at Rome, Fig. 76, formerly known as the Temple of Vesta. This structure is circular peripteral, of Parian marble, and is approached by marble steps. It was originally domed over the cella, but is now covered with a frame roof directly over the columns. At present it is used as the Church of S. M. del Sole.

The Pantheon at Rome, Fig. 77, is a circular structure having an internal diameter of 142 feet 6 inches, which is

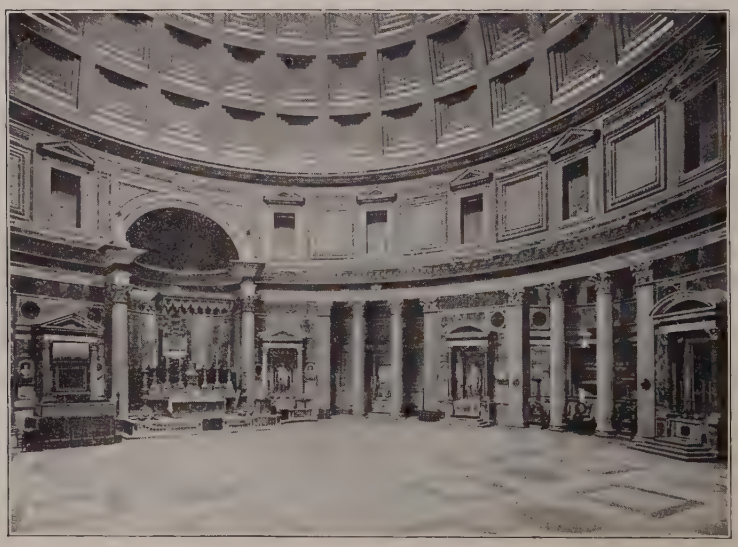


Fig. 78

also its height. The walls are 20 feet in thickness, and contain eight niches, or recesses. In front of each of these recesses is a pair of columns. On the exterior is a Corinthian octastyle portico, the columns of which are 42 feet 6 inches high. The dome over this circular structure is a hemisphere, and is coffered on the interior to form a number of panels. In the center of the dome is a circular opening

27 feet in diameter. This forms the sole means of illuminating the interior, which is shown in Fig. 78. The building is now used as the Church of S. Maria Rotonda.

Another circular temple is the Temple of Vesta at Tivoli, 19 miles from Rome. This structure is peripteral, has a cella 24 feet in diameter, and is surrounded by a peristyle of eighteen Corinthian columns, each being 23 feet 6 inches high.

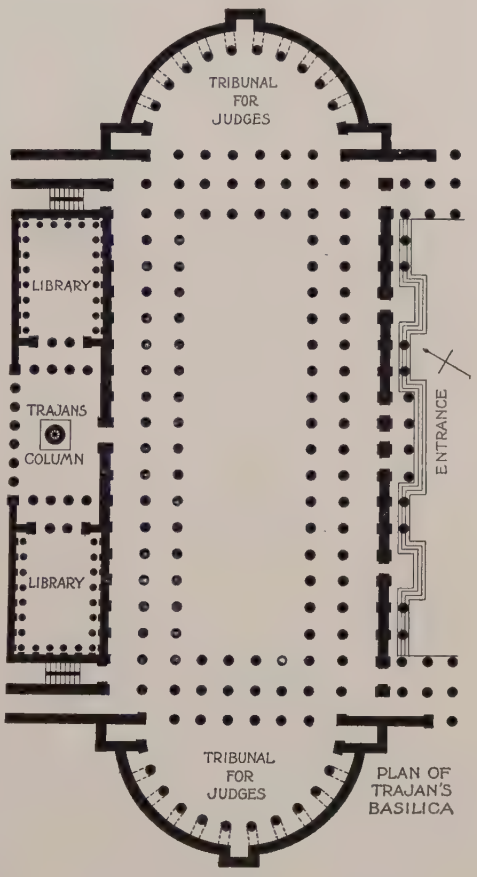
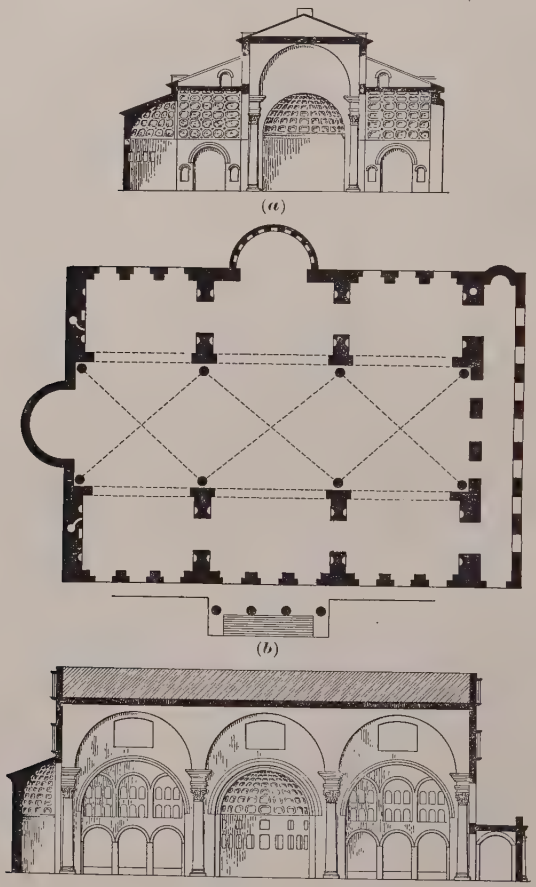


Fig. 79

116. Basilicas. Basilicas were erected as halls of justice, but were often used by merchants as places of exchange. They represent some of the handsomest buildings that ever existed in Rome, and are monuments to the importance that the Romans attached to the affairs of law and equity. They are of interest, too, in their influence on the subsequent Christian architecture, as will be pointed out later. The plan of the basilica was a rectangle, as shown in the Basilica of Trajan, Fig. 79, the length of which was twice the width, or more in many cases. Two, and occasionally four, rows of columns extended through the length of the building, dividing it into aisles, over which

galleries were sometimes constructed. The entrance was either at one side or one end, and usually opposite the entrance was a semicircular termination called an *apse*, on which was a raised dais, or platform, upon which the tribunal sat. Arranged



(*a*)

(*b*)

(*c*)

FIG. 80

around the platform were seats for the assembled orators and other persons interested in the matters on trial. In front of the tribunal was an altar on which sacrifices were offered before the beginning of all important business. The buildings

were usually covered with a wooden roof, and the exterior was generally simple and unimpressive. The interior, however, was elaborately decorated with marble and carvings.

Other arrangements of the basilica included the vaulting of the ceiling, which was carried on a number of piers, as in the Basilica of Maxentius, Fig. 80, thus avoiding the necessity of many columns. The Basilica of Maxentius was 265 feet long by 83 feet wide, and was crowned by an immense groined vault in three compartments 120 feet above the pavement. The aisles running north and south were roofed with semicircular vaults 76 feet in span. There were two apses, one to the north and the other to the west end of the central nave. Light was introduced by *lunettes*, or circular windows, in the upper part of the nave, through the wall formed by the intersecting vaulting.

117. Public Baths.—The public baths, or *thermæ*, were characteristic of Roman civilization and corresponded largely in their national standing with the gymnasiums of the Greeks. All of these baths are now in ruins, but important remains exist in Rome and Pompeii. However, much interesting information can be found on the subject from writings of the Italian architect Palladio, who, in the 16th century, prepared essays in which they are described. The Roman *thermæ* took the place of the daily newspaper and of the club, and was a general meeting place in social life. Here all Rome gathered to gossip and to hear the news of the day. A small entrance fee amounting to about a quarter of a cent was charged, although later they were thrown open entirely free.

In general arrangement, there was one section set aside for the baths proper, the process of which was very similar to the modern Turkish bath. A warm room, called the *tepidarium*, was provided in which the bathers could rest. Other rooms of varying degrees of heat provided places of extreme temperatures, cold plunges with dressing rooms, rooms for massage and annointment, and places for games, libraries, and even occasionally a theater. In some of the baths, space was laid out as a stadium, with raised seats for

spectators. Various athletic sports, such as races, wrestling, and boxing, took place. Rooms for lectures were provided, and every feature conceivable to add to the pleasure of inland life was made a part of these great institutions.

118. The baths of Caracalla at Rome had accommodations for sixteen hundred bathers. The building and its gardens were raised on a terrace that was 20 feet high and about $\frac{1}{5}$ mile square. Under this terrace were vaulted chambers that were used as stores, furnaces for heating water, and hot-air ducts. It is easy to conceive that buildings as important to the public as these would be richly ornamented and lavishly designed. Sumptuous internal magnificence was desired in all of these great institutions. The pavement was mosaic, being arranged either in geometrical patterns or in inlaid designs representing athletes and dancing girls. The lower walls were sheathed with colored marble, and the upper portion was covered with stucco in bright colors. Columns of granite, porphyry, and alabaster supported the vaults, and these were richly coffered and garnished with ornamental figures in metal and mosaic. The finest sculpture of antiquity was displayed throughout these sumptuous halls, much of it being brought from Greece or executed in Rome by Greek artists. The various basins and plunges were constantly supplied with streams of sparkling water flowing from the mouths of sculptured lions or griffins wrought in polished silver, producing in themselves the most cooling effect during the heavy, sultry, summer weather.

FIG. 81

119. Theaters and Amphitheaters.—The Romans adopted the Greek idea of the theater, but instead of carrying

the outline of the auditorium to more than a semicircle, they restricted it to simply a semicircle. The stage was raised considerably, and was treated with great richness and

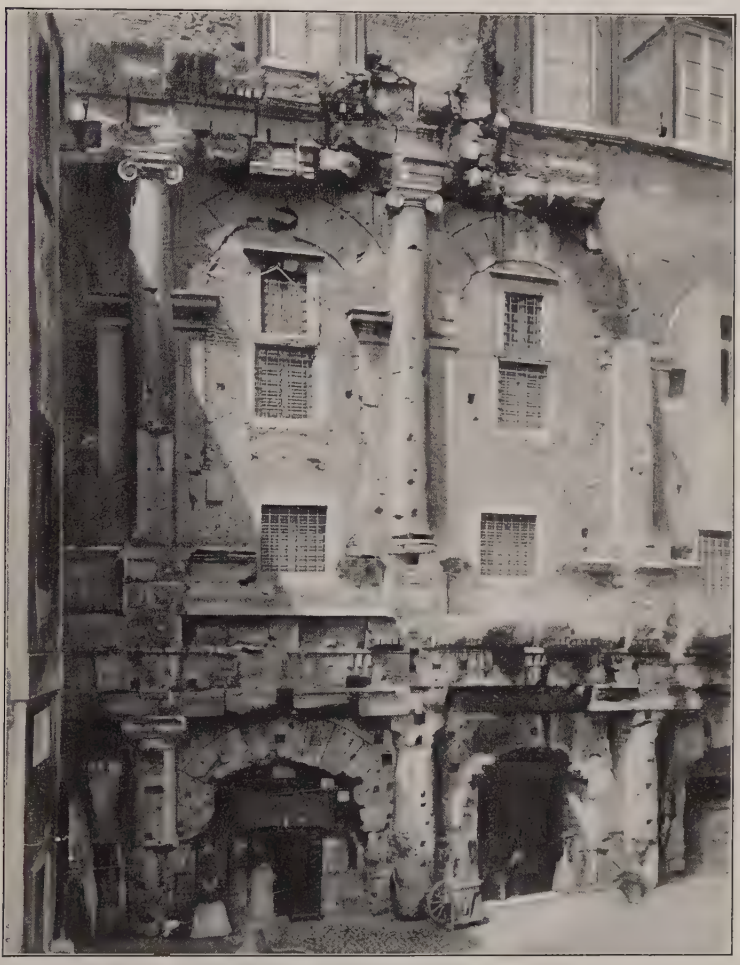


FIG. 82

elaboration. Where the condition of the country permitted, the theaters were erected on a side hill; but under other conditions, the art of vaulting enabled them to construct the

FIG. 83

upper portion on a tier of corridors and get quite the same result. The theater of Marcellus, at Rome, is the only existing example in that city. These arcades were faced in the usual Roman manner with columns and entablatures, as shown in Fig. 81, wherein the Doric order was used in the first story and the Ionic order above. The building has been altered recently by walling up the arches and converting the façade into a solid front, but the outlines of the original openings may still be traced, as in Fig. 82. This structure originally consisted of two stories of arcades around a semicircular auditorium.

120. The amphitheaters, however, are characteristic Roman amusement buildings. They are found in various sizes in every important Roman city, and were used for naval exhibitions, gladiatorial contests, mimic battles, etc.

The Flavian amphitheater of Rome, Fig. 83, usually called the Colosseum, on account of its great size, was commenced in 70 A. D. In plan it was a vast ellipse 620 feet long and 513 feet wide. Each story of this structure possessed eighty openings on the outside wall, those on the ground floor forming entrances. The area of the arena, or center, was 180 ft. $\times$ 287 ft. surrounded by a wall 15 feet high. The seats were cut out of solid stone, raised one behind the other from the arena, and were supported by vaulting over corridors and staircases below. Under the lowest tier of seats were located dens for wild beasts, and these opened directly into the arena. In the auditorium, the seats were divided into four ranges, the two lower tiers being separated from the third by means of a wall. Access to the top row of seats, which was added later, was by means of staircases between the radiating walls and by corridors leading from the eighty entrances. On the exterior, the building was four stories in height, the openings being arched in the lower stories and flanked with columns, while the upper story was a flanked wall with pilasters, between which were brackets to support the masts, which in turn carried an immense velarium, or awning, extending over all of the seats. In no building of Roman construction

FIG. 84

FIG. 85

is the character of architecture more clearly expressed than in this. These four stories erected of concrete, with arches between immense piers, constitute the building.

Fig. 86

121. Triumphal Arches.—In Rome it was customary when an emperor or a general won a great victory to erect an arch of triumph in his honor. These structures sometimes consisted of simply a single arch supported by two buttresses and ornamented with characteristic decorations, and often three arches were used—a large one in the middle and a smaller one on each side. Above the architectural composition was usually an attic, or surmounting mass of stonework, carrying an explanatory inscription. The arch of Titus, Fig. 84, is an example of the single-arch type, and was erected in 70 A. D. to commemorate the capture of Jerusalem. On each side of the arch are columns attached to the surface. The archway is ornamented with deep coffers, and on the inner jambs are carvings in relief, one side representing the emperor in a triumphal car and the other showing the spoils taken from the temple at Jerusalem.

Many of these arches still exist, and the arch of Constantine of Rome, Fig. 85, erected in 312 A. D., is a good example of the three-arch type. This was built in honor of the victory over Maxentius. Corinthian columns entirely detached from the structure support the entablature, which projects out over the capital of each column and returns. The attic extends the full width of the composition, which is 76 feet, and elaborately carved figures rest on pedestals over each of the columns. Originally, a two-wheeled chariot and horses surmounted the top.

122. Pillars of Victory.—Pillars of victory, or memorial columns, instead of arches, were sometimes used to record these triumphs. The famous Trajan's column in Rome, shown in Fig. 86, furnishes a good example of this kind of monument. This is a simple column of the Doric order, and rests on a pedestal about 17 feet square and 18 feet high. The column is 12 feet in diameter and 147 feet high. Around it is a winding spiral of sculptures containing twenty-five hundred human figures, besides animals and chariots, representing the extent of Trajan's war with the Dacians.

123. Tombs.—The Romans practiced both burial and cremation, and in their tombs are frequently found sarcophagi and metal urns. There are several varieties of Roman tombs. First, those in which vases of ashes or remains in coffins were placed in subterranean vaults or caves, now familiarly known as the *catacombs*. There were monumental tombs that were square or circular and crowned with a pyramidal roof. The most important of these is the Tomb of Cecilia Metella, near Rome. It is circular, 94 feet in diameter and about 50 feet high from the base to the top of the cornice. The wall is divided into three general parts corresponding approximately to the proportions of the Corinthian order. The wall space occupies the column height and the cornice and base are proportioned to correspond with the entablature and pedestal of the order. The facing and cornice were of marble and the freize was enriched with elaborate carvings of garlands and ox skulls.

The side walls were rusticated; that is, built of stones with rebated joints so as to leave the centers in raised panels.

Originally, the roof was domed over in a somewhat conical form, but during the middle ages alterations were made, and the battlemented, or notched, superstructure was added.

Pyramid tombs, influenced by Egyptian ideas, also existed,

Fig. 87

and smaller, isolated monuments are often seen. In the far East, there were rock-cut tombs.

124. Aqueducts and Bridges.—The Romans did not hesitate to build immense aqueducts for conveying water to their cities. Rome itself required immense quantities of water for public use, fountains, baths, etc. The local service being poor, immense aqueducts had to be built far into the mountains. These aqueducts consisted of a series of arches over which a cement-lined channel was carried, and sometimes formed bridges. The bridges were built across streams on immense arches that extended on piers from bank to bank.

125. Palaces.—Of the Roman palaces, there is nothing left but ruins and a few historical records. Enough remains, however, to show that they were enormous structures of the most imposing character. The chief apartments in the palaces of the emperors were the throne room; the basilica, or justice hall; the peristylium, a square garden surrounded by a colonnade; the banqueting hall; the bathing room; and an apartment set aside for statues of the gods. Besides these, there were sleeping rooms and many smaller apartments, the uses of which have not been preserved.

ANALYTICAL STUDY

PLANS

126. The essential differences between the plans of the Greek and Roman buildings are first, size; and second, refinement. The Greek plans were comparatively small, the proportion being the element of first importance, whereas the Roman plans attempted to give an elaboration of vastness and magnificence. The Romans were great constructors, and did not hesitate to build immense bridges and aqueducts to convey water from great distances. Their entire empire was an example of vastness, and enormous buildings were characteristic of their work. The Greeks were simple, artistic, and refined in their tastes. Each section of Greece founded an example of one or more of the three styles of architecture. Purity and severity of outline of the simple post and beam construction did not lend a great variety, and therefore each building was studied for simplicity in itself. The plan had to be considered in detail first as on it depended the size and spanning of the columns. The Romans took the arch, vault, and dome, and on these keyed the whole system of construction. Unlimited openings could be spanned, and by means of the vault and dome immense areas could be covered. The enclosing and the covering of these buildings were thus simple matters, and it

became purely a matter of ornamentation to appliqué, or "stick on," the architectural orders and their details in order to give style to these buildings. The Greek temples were delicately proportioned, simply designed, and usually orientated; that is, they faced the east. The Roman temples were elaborate and complicated, and no attention was paid to orientation.

WALLS

127. Greek buildings were constructed of large blocks of marble, no mortar being used to unite them, and stability was secured solely by the observance of the laws of gravitation. The buildings were completed and the entire surface polished to give an even finish. The walls of Roman buildings were constructed of small, coarse, and crude materials. Concrete was made of brick or rubble mixed with cement, and was bonded regularly to give it proper strength. These walls were faced with an ashlar of marble or other stone, and the architectural effect was obtained from this facing. The Roman system of building was very economical, as all scraps and chippings could be used to make the concrete of which the walls were composed that enclosed their building.

ROOFS

128. In the Greek temples, the slope of the roof determined the form of the pediment. The eaves presented a row of richly carved antefixæ at the end of each run of tiles, and gargoyles in the form of lions' heads served as spouts from which rainwater was discharged. In Rome, the vault covered all important areas. Wood construction was frequently used, and in many instances formed the decorative element for a ceiling. As a rule, however, the Roman roofs were of terra cotta or of bronze, but the roof formed no architectural detail of the building, as the walls were crowned with parapets and balustrades that effectively hid the roof construction. The pediment, like the orders, was used only as a detail to be appliquéd to the walls.

COLUMNS

129. When the Romans adopted the Greek orders, they altered them materially to suit their own conditions, and the result was not an artistic one. The three simple orders of the Greeks being insufficient for the elaborate constructions of the Romans, two others were invented, the **Tuscan order,** which is simpler than the Doric, and the **Composite order,** which is more elaborate than the Corinthian. In connection with each of the orders, the pedestal was introduced, and although the relation of the diameter to the length of the column varied in each order, the proportions of the pedestals and entablatures remained about the same.

130. In Fig. 88 is shown a group of the five orders of architecture according to the Roman standard, which was first published by Vignola, an Italian author, in 1563 A. D. The height of the Tuscan column *A* is seven times its diameter, that of the Doric *B* eight, the Ionic *C* nine, and the Corinthian *D* and the Composite *E*, ten. The pedestal is always one-third the column height, and the entablature one-fourth to one-fifth.

The Tuscan order seems to be a modified form of the Doric, while the Roman Doric order is a much elaborated form of the Doric. It will be observed in comparing these two orders that the Tuscan column is unfluted and that the base consists of a single torus molding separated from the shaft by a fillet; its architrave and frieze are unbroken, and its cornice consists of the fewest possible simple moldings. In the Doric, however, the base is similar to the Tuscan, but the shaft is grooved with flutes that meet in an arris, as did the Greek Doric column. The echinus is ornamented with an egg-and-dart pattern, while the frieze exhibits the characteristic triglyph of the Doric order and the soffit of the cornice is supported on a mutule. The space between the mutules is coffered and paneled. The peculiar difference between the Greek Doric and the Roman Doric orders is exhibited in the fact that when a triglyph occurs at the end

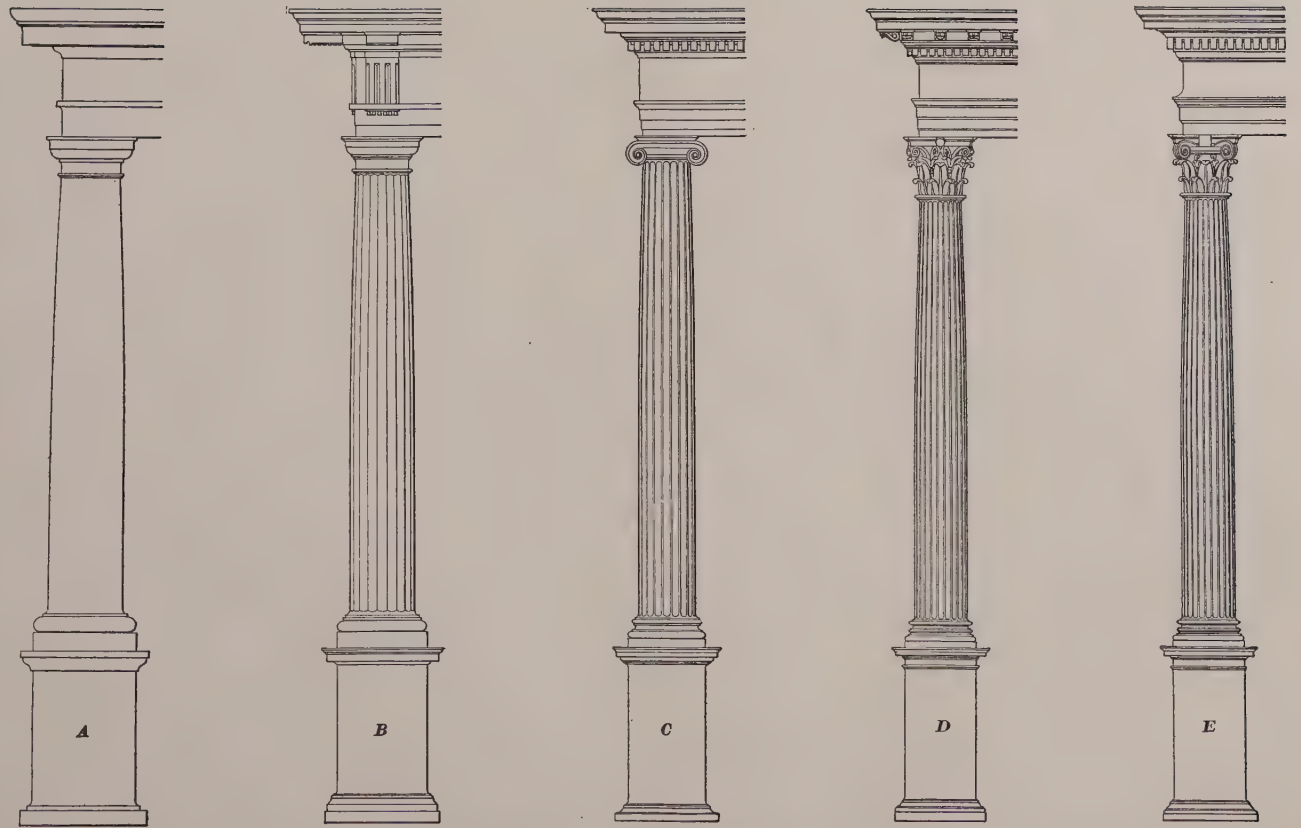


FIG. 88

of a Greek composition, it is placed at the angle of the building, as can be seen in the illustration of the Parthenon, Fig. 42, but in all cases it is placed over the center of the column in Roman style. Moreover, there were two forms of the Doric order characteristic of Roman art—one whose cornice was decorated with mutules, and the other where a row of dentils was substituted, thus practically introducing elements of the Ionic order in the Doric composition.

The Ionic order bears a resemblance to its Greek prototype. The scrolls, however, are smaller and less refined. The base is simplified, and consists of a scotia between a large and a small torus molding. This base is usually known as the attic base. The entablature is rendered more complicated by dividing the architrave into three bands, and frequently by decorating the frieze.

The Corinthian and the Composite orders are practically of the same general proportion and style, the only difference being the amount of ornamentation and elaboration. The Roman Corinthian order is heavier and more elaborate than the Greek Corinthian. Where mutules supported the cornice of the Doric order, a new element in the form of a bracket, or console, was introduced in the Corinthian. The abacus of the capital is no longer square, as the sides are concaved. The Composite order possesses the same characteristic as the Corinthian, except that the scrolls are larger, making the capital appear like a combination of the Ionic and the Composite. In the Corinthian order, the small scrolls at the top of the capital seem to grow naturally out of the foliage, while in the Composite order, the forms of the four-sided corona seem to be set on top of the foliage. The soffit of the corona is coffered in some instances, and large consoles, or dentils, or both, are frequently used to support it. The Composite order was always elaborately decorated, rich carving being an essential part of its composition. The columns were nearly always fluted, but examples exist, as in the Pantheon, where rich granite and marble columns were left smooth to show the beautiful characteristics of the materials. In some examples, the capitals were gilded.

131. From the foregoing, it would seem that the architectural orders as used by the Romans were purely decorative features. Strongly contrasted is this with the orders as used by the Greeks, with whom the columns were structural necessities. A pair of columns and a beam represents the entire theory of Greek architecture. In Rome, however, as has been said before, the orders were appliquéd on the surface of the buildings, and possessed no structural importance whatever. In the Roman art, the columns were frequently superimposed one over another and supported on pedestals. When orders were so superimposed, the arrangement, according to a general established custom, was from the sturdy column of the Tuscan order at the bottom to the more delicate Corinthian and Composite at the top. The lower stories of buildings were usually designed in the Doric order, while the superimposed stories were designed successively in the Ionic, Corinthian, and Composite. In Greek architecture, however, the buildings were apparently never more than one story in height; thus, only one order of columns was used on the exterior. Superimposed orders have been known where galleries existed on the interior, but they are of minor importance and therefore cannot be compared with the Roman system.

132. The Doric order was especially favored by the Greeks and was considered the most important. It was used without a base and is found in all of the most important temples. This order, however, was rarely used by the Romans, as it was too simple for their ideas of splendor.

The Ionic order was executed with great refinement by the Greeks, its capitals showing scrolls on two sides only. This order with the Romans was designed to show four sides of the volutes, and the entablature was greatly enriched.

From the records of Grecian art, the Corinthian order exists in only two cases, and both examples indicate a decline of this art, when sculpture gave way to mere stone carving. It was used in small buildings only, and was simple in form. With the Romans, however, the Corinthian order was favored.

It was used in all of their largest temples and most important buildings. Instead of being simple, the Corinthian is the most elaborate of all of the borrowed orders. The frieze and architrave were elaborately carved, and the moldings were enriched with small ornaments. The consoles and modillions introduced in the cornice were also elaborately carved. In both cases of the Greek examples, the shaft was fluted; whereas, in Rome, the shaft is found to be plain or fluted, according to the material of which the columns were constructed.

The Composite order was invented by the Romans in order to secure a more elaborate scheme of decoration. The Ionic and Corinthian capitals were combined, and the general details of the Corinthian order were elaborated in order to secure the richness demanded by the Roman taste.

OPENINGS

133. In Greek architecture, the openings are of small importance, the treatment of them being severe. The effects of light and shade on the buildings were obtained by the flanking columns. Doorways and windows were square-headed, and occasionally they were crowned by a cornice supported on consoles, as in the Erechtheum. In Roman architecture, however, the openings were features of great importance. Some were square-headed, and some semicircular. The semicircle as a window head was frequently divided by vertical mullions, or sometimes by a mullion up to the center of the arch, where it was crossed by a transom bar.

MOLDINGS

134. Greek moldings were introduced in order to produce refined effects of light and shade on the graceful contour they possessed. Where dentils were introduced, they were well spaced and occupied the whole depth of the molding. The Romans, however, destroyed the contour of their moldings by the introduction of carvings. Greek moldings were

always conic sections; the Roman moldings, sections of a circle. No attempt at refinement of form was made, but every effort was put forth for elaborate display. Roman dentils are placed close together and are not cut to the full depth of the moldings. Under the cornices of the Roman orders, however, consoles are introduced to serve as brackets for their support, whereas the Greeks only use consoles as vertical brackets on the side of doorways, as in the Erechtheum. The Romans occasionally used the vertical console in the center of their arches to serve as a keystone.

ROMAN ORNAMENT

135. It is a difficult matter to find original types in Roman ornament. Most of their ideas were borrowed from Greece and were adapted to their particular purpose. In their carved work, we find less conventionalism than is characteristic of the Greeks, and a stronger tendency to favor elaboration. The acanthus was much used in scroll patterns and on the capitals of the Corinthian and composite orders, but the scroll patterns never presented the refinement of the Greek. Instead of a parent stem from which radiated offshoots, the Roman ornament consisted usually of one scroll growing out of another scroll and ending in a flower, as shown in Fig. 89. The Romans did not excel either in sculpture or painting, and in many cases show great vulgarity of sentiment. They were fine judges of rare marbles, however, and in many instances made up for their lack of

FIG. 89

skill in painting by their tasteful selection of rich marbles for dados, wall surfaces, pilasters, and friezes. These were imported from every part of the known world, and no expense was spared to produce the richest effects possible with these materials. Many of the friezes of the Roman entablatures are decorated with carvings representing ox skulls, between which festoons and garlands of fruit and flowers are hung. These designs are supposed to have originated from actual skulls and garlands that were hung on alters at which these beasts had been slain, thus showing the origin in all its crudity of their decorative motifs. Wall paintings as seen in Roman architecture were probably by Greek artists and are characteristic of the villas of Pompeii. These will be considered later.

ROMAN HOUSES

136. The Roman dwelling was a simple structure, and had its principal apartments on the ground floor. The entrance vestibule was simply an unroofed hall and was generally lined on either side by a row of graceful statues. The floor of the threshold was usually of mosaic marble, in which was inlaid the word *Salve*, meaning "welcome." Beyond this doorway was the atrium, or forecourt, a large central reception hall with wings on either side, from which it was separated by pillars. The floor of the atrium was generally mosaic of colored marble or glass, the walls were carved and painted, and the roofs contained bright gardens in which one could walk in the middle of the day. Beyond the atrium was a large room called the *peristyle*, so named on account of its surrounding line of columns. In the service rooms, could be found sideboards loaded with gold and silver plates, amber vases, beakers of bronze, and glass vessels from Alexandria, the tints of which rivaled the opal and the ruby.

Of course this description is of the residences of the wealthy. The poor people lived the best they could, but as a matter of fact the rich of this period were without many of the comforts and conveniences that the poor enjoy today.

POMPEIAN ARCHITECTURE

137. Pompeii was a distant suburb of Rome. The architecture of Pompeii can hardly be considered a style by itself; it was a combination of the Greek and late Roman. There is every reason to believe that the dwelling houses in Pompeii were copied from dwellings of the Greeks. That Greek artists were employed in their decorations, there is not the shadow of a doubt. These residences consisted of an atrium with a peristyle beyond, around which were grouped the family apartments. The street fronts of the houses were

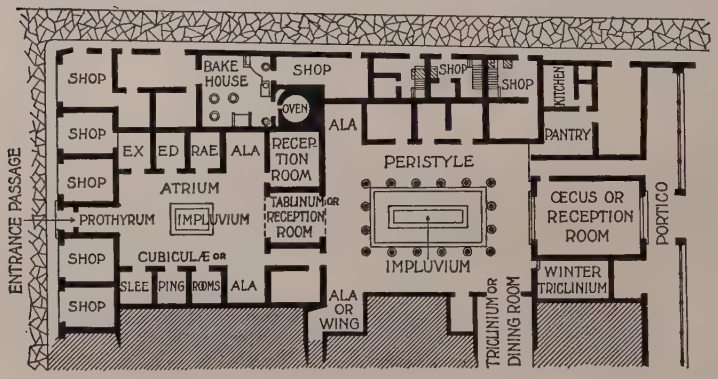


Fig. 90

plain, and were usually occupied as shops, or stores, as shown in Fig. 90. No windows existed toward the street sides, as, owing to the absence of glass or other suitable material, no privacy could be attained with street openings from the rooms. The atrium and peristyle were only partly roofed over, and light entered the private rooms from these apartments, while a basin, or impluvium, in the middle of the apartment served to catch the rainwater as it drained from the roof. As a rule, Pompeian houses were only one story high, but traces of stairways in existing examples tend to indicate that upper floors were occasionally used. The example shown in Fig. 88 is known as the House of Pansa. It faced on three streets and had a garden in the rear.

FIG. 91

138. Pompeian Wall Decoration.—Pompeian wall decoration consisted of a panel treatment wherein the wall was usually subdivided into three parts, corresponding to the pedestal, the column, and the entablature of the orders. The colors were rich and the subjects exceedingly conventional. Representations of villas and balconies in perspective were very common, as was also the introduction of figures, dancing girls, etc., somewhat after the Greek style. The colors used were very brilliant, red and black being used profusely for purposes of contrast. The pictures on the walls were frequently framed with architectural details consisting of slender shafts and delicate entablatures, which were nearly always rendered in a crude form of perspective. Pompeian decoration may be considered as a reflection of painted decorations that could be found in the Roman baths and other public buildings. This is a style that is more characteristic of Pompeii and one that does not associate with Roman art, as all of its elements are far too delicate to be suggestive of the elaborate and ostentatious decorations that must have adorned the walls of Roman buildings. See Fig. 91.

REVIEW EXERCISES

1. What are the chief characteristics of Roman architecture?
2. What new architectural detail did the Romans introduce?
3. What are the essential differences between Roman and Greek architecture?
4. Of what material were Roman walls chiefly built?
5. What were the principal Roman structures?
6. Describe the Roman residence and the manners and customs of the nation.
7. In what manner did the Romans make use of the Greek orders?
8. On a sheet of paper 9 in. × 12 in., make an outline elevation of: (*a*) the arch of Titus; (*b*) the arch of Constantine. Omit all details, but carry out the proper proportions of the orders.
9. Make a drawing of the elevation of the tomb of Cecilia Metella from the description given in Art. **123.**
10. Write out a complete description of Fig. 75, 76, 77, or 83, giving every detail so that a drawing of it could be made from your written description. A similar description is given in Art. **123.**

EARLY CHRISTIAN ARCHITECTURE

(300 A. D. TO 604 A. D.)

INFLUENCES

139. Geographical.—In 323 A. D. Emperor Constantine removed the capital of the empire from Rome to the old Greek city of Byzantium, now generally known as Constantinople (see map, Fig. 71). Before this time, many of the Roman emperors lived in Milan, Nicomedia, and other cities, but the transfer of the capital to a Greek city indicates how completely the Roman Empire had grown to overshadow the city of Rome and even the peninsula of Italy itself. It should therefore be borne in mind that during all of the period heretofore discussed, the term *Rome* applied practically to the civilized portion of the continent of Europe, and that the city of Rome was a small factor after the empire was established. On the death of Theodosius, in 395 A. D., the Roman Empire was divided between his two sons, and from that period the history of Rome divided itself into two distinct epochs and the architecture of the world developed into two separate styles. The Western, or Latin, Empire preserved many of the customs and traditions of the old Romans, but the Eastern, or Byzantine, Empire, absorbed Oriental ideas and gradually developed new systems, different government, religion, and architecture.

140. Geological.—Roman buildings, many of which were in ruins and scattered from one end of the empire to the other, not only afforded material from which Christian structures could be built, but at the same time influenced the architectural treatment by furnishing ideas as to how the buildings could be erected. The Christians, in erecting churches for their own purposes, took the ready-made columns

from the Roman structures and either adapted them at first to their new conditions, or adapted the conditions to the architectural style of the ancient Roman days.

141. Religious.—No event in history presents so remarkable a phenomenon as the rise and spread of Christianity in the 4th century A. D. After the Romans adopted Christianity as a state religion, in 324 A. D., it spread to the furthermost corners of the empire, a diffusion that was rendered possible only by the condition of the other religions at that time. As far back as the time of Augustus, several religious beliefs were recognized throughout Rome, but with the exception of the Jews, all were pagans and polythiests. The religious rites performed by the Romans in their temples were decidedly political and failed to impress the populace with any deep respect for the deity, and it was evident on every side that the people had little faith in their gods and therefore were ready to adopt a new religion that was simple and easily understood.

142. The persecutions of the Christians in subsequent periods of Rome were not religious persecutions, but political ones. The Roman Empire had ever been noted for its tolerance of the religions of other nations, but Christianity was a religion, not of a nation, but of a sect, and it stated that all other religions were false, must be abandoned, and through its disciples it endeavored to draw into its ranks as many as possible from all walks of life. The Christians held their meetings in secret places and in the catacombs, and thus effected a strong and numerous body that was considered dangerous from a political standpoint. But their recognition by Constantine raised them at once to a political body of Rome, and all obstinacy that had heretofore impeded Christianity development was at once swept away, and though not emanating from a nation, the religion dominated the Roman people and was destined to dominate all Europe. The early Christian architectural period is generally taken from the reign of Constantine to the reign of Gregory the Great, about the years 300 to 604 A. D.

143. Political and Historical.—While Oriental civilization was exerting its influence over the Eastern Roman Empire, the Western Empire, comprising what was afterward Italy, France, and Spain, continued to exist as the Latin country. The Gothic tribes that had for centuries inhabited the countries to the North, had ever been dangerous enemies of Rome, but their contact with the Romans acquainted them with Roman civilization and its Christianity, and the Goths gradually became Christians by the teachings of a bishop named Ulfilas. The invasions of Italy from the North commenced about 376 A. D., and the various barbaric tribes clustered around the northern part and finally crossed and conquered Rome in 476 A. D.

In the latter part of the 4th century, the Tartars and the Huns, being driven from Eastern Asia, invaded Europe, defeated the Goths, and established a new kingdom of Hungary north of the Danube. The Goths appealed to Emperor Valens, who then ruled at Constantinople, to allow them to cross to the south side of the Danube. Permission was granted on the barbaric condition that they should give up their children and their arms. This being agreed to, Roman boats were provided, and the fugitives were transferred apparently according to the agreement. However, although they surrendered their children with little concern, they paid all they had in money to bribe the Roman officers to be allowed to keep their arms. In this way a million souls settled, sword in hand, within one of the natural frontiers of the Roman Empire. Almost immediately, disagreements arose and they turned their arms against Emperor Valens and advanced toward Constantinople. In 378 A. D., the first battle took place at Hadrianople, where Valens lost his life. The Goths then spread themselves over this fertile country to the confines of Italy and the Adriatic Sea.

Under Theodosius the Great, who succeeded Valens, the Goths settled down to live with the Romans in peace, and many of them took service in the Roman armies. At the death of Theodosius, however, they revolted, and precipitated themselves on Italy and completely overran the peninsula.

144. The Western Empire was now fast dissolving, and in the early part of the 5th century, Britain was evacuated by the Romans and was soon overrun by the Angles and Saxons, barbaric tribes from Northern Germany. The Teutonic tribes from the North rushed into Gaul, and from Gaul into Spain. Spain was conquered by the Vandals, a Moorish tribe from Northern Africa. The Huns that had driven the Goths into the Eastern Empire, now started under Attila to conquer the world. With this intention, a half million savages crossed the Rhine and pierced the center of Gaul, but were soon defeated by the united power of the Romans, Goths, and Franks. Attila then entered Italy, where he was again defeated, and finally he returned to his kingdom of Hungary. No sooner had Attila departed than the Vandals from Africa crossed and anchored their ships at the mouth of the river Tiber. They attacked and captured the city of Rome in 455 A. D., and for two weeks the Vandals and Moors wrecked and pillaged the city, carrying shiploads of captives and treasures back to Carthage. During all of this time there were still emperors in Rome, but the real power was in the hands of the barbarians, and the emperors themselves were merely figureheads until 476, when the barbarians overthrew the emperor and their leader Odoacer was proclaimed king of the peninsula of Italy. The Roman Empire was thus broken up, and the separate countries of Europe left to take form.

145. As previously stated, the period of early Christian architecture extends from the reign of Constantine, 300 A. D., to that of Gregory the Great, 604 A. D. During the reign of Gregory the Great, the Latin language and the early Christian architecture, which was based entirely on Roman principles of construction, ceased to exist, and for 200 years new languages developed in different parts of Europe, while architecture was practically at a standstill. The languages that developed in the different sections were all based on the Latin tongue, but through the influence of the conquering barbarians, Spanish, French, English, German, etc., were

developed. During these two centuries, the traditions of ancient Rome were gradually forgotten. Each country had its own king and was occupied solely in its own affairs. The Church grew in power and preserved the thread of history. Through the influence of the Church and the necessity of working economically with the materials at hand, instead of following the heavy engineering methods of the Romans, a new style of architecture developed.

CHARACTERISTICS

146. Early Christian architecture developed so gradually from the Roman style that it is practically impossible to tell where one style ends and another commences, and this is the case throughout all periods of art, although the transition stage is more apparent as we advance toward the later styles. The early Christians had very little money at their disposal, and in order to erect a place of worship, a method of construction had to be followed that required few tools and economical materials. Roman temples were now useless for their original purpose, as the old pagan religion had disappeared, and where these temples were large enough and in suitable condition they were adopted just as they stood for the purpose of Christian worship. New churches were occasionally built on the model of the old Roman basilica, and in these new constructions, columns and other details from the ruins of classic buildings were frequently introduced. Therefore, in these early Christian buildings are found columns of different sizes and orders, with no attempt at proportion of diameter to height. If a column were too short, pieces of stone in the form of a plinth were placed below it; if too long, it was cut off. Thus we find a lack of symmetry and unity in the details of these buildings, strongly illustrative of the poverty of the time. However, though this period may be of interest to the archeologist, the buildings erected are of little value to the architectural student, as they present no distinct style, or even a borrowed style, but a reunion of materials to serve the new purpose.

147. The early basilican church had three or five aisles. In one form of these churches, a wooden roof was used as a covering, after the manner of the Basilica of Trajan, Fig. 79, while in others the roof was vaulted, similar to the Basilica of Maxentius, Fig. 80. From one form of this early Christian church, the Gothic style of architecture developed in Western Europe; from the other form, the Byzantine style in Eastern Europe.

148. The plan of the basilica as used by the Romans for a hall of justice was accepted by the early Christians as the most suitable arrangement for their particular form of worship. These structures served as stepping stones to the Gothic cathedrals, which certainly were developed from the basilican plan. So suitable has this plan proved that down to the present day few alterations have been made in it. The semicircular apse, raised and railed off from the main part of the building, was a most suitable place for an altar, while the wide, open aisles provided ample space for the assembling of the congregation.

When structures were erected later, purposely for the use of the church, the same plan was adhered to, and the buildings were still called basilicas. But instead of keeping all the aisles parallel with the length of the building a cross-aisle, called the *transept*, was introduced near one end, and the sides of the building were extended somewhat at the extremities of this aisle, thus converting the rectangular plan to the form of a cross. The center aisle from the transept to the entrance then became known as the *nave* of the church, and the part from the transept to the apse was called the *choir*. The nave was usually built to extend above the roofs over the side aisles in order to form a clearstory for the admission of light, and windows were introduced in the side walls for the same purpose. The walls at the ends of the church, however, and particularly those of the apse, were left solid in the early basilicas and were decorated with paintings and mosaics.

EXAMPLES

149. The first three edifices erected solely for the purpose of Christian worship, were the basilicas of St. Peter, St. John Lateran, and St. Paul. The first named was by far the finest, being 380 feet long and 212 feet wide. All three possessed five aisles (though later basilicas were limited to three), and the central aisle, or nave, of St. Peter's measured 80 feet across.

The structures each fronted on a large, open courtyard, or *atrium*, where converts to the faith and candidates

FIG. 92

for baptism assembled. The atrium was considered a most important adjunct to the early basilicas, but was abandoned when, after the fall of the Roman empire, the church became an independent power and structures were erected in remote districts, away from the influence of their early Roman prototypes. In the Roman residence, the atrium had been the place where all functions were held and it thus became a natural adjunct to edifices where Christians assembled for worship.

150. The interiors of these buildings were rich in effect, and elaborate wall decorations of glass mosaic were frequently placed in a broad band around the nave arcade and lined the bottom of the apse at the end, as shown in the basilican church of St. Paul, Fig. 92. This illustration also shows the rich timber ceiling divided into compartments that were elaborately decorated and gilded.

The pavements of these structures are also details of great interest, as they were made of stone and rich marbles laid in geometrical bands to produce a pattern. Old columns were cut into slices, thus forming central circles around which patterns could be worked in other stone.

There were in all thirty-one basilican churches in Rome, all of which were made up largely of fragments of early pagan buildings. They were very similar in general detail, and the basilica of St. Paul is characteristic of their general style.

151. Baptisteries.—Baptisteries form another class of building characteristic of early Christian architecture. Originally, these structures were used only for baptismal ceremonies, from which they derive their name. Their form, which is usually circular, was derived from the circular tombs and temples of the Roman Empire. As a rule, the baptisteries were detached buildings adjoining the atrium of the basilica, and not until the end of the 6th century was the baptismal font placed within the walls of the church.

152. Tombs.—One of the first Christian tombs recorded is that erected by Constantine for his daughter, in 330 A. D. This tomb had a dome 35 feet in diameter and was supported upon twelve pairs of granite columns. It was converted into a church in 1256 A. D.

It will be observed that a great change of purpose has taken place in tombs since the days of early Egypt, when the final resting place for the dead was but a small chamber in an immense stone structure like the pyramids. Tombs and temples were separate structures then, but thereafter the tombs of important personages were erected in the churches.

ANALYTICAL STUDY

PLANS

153. The early Christians adopted the basilican model for their churches, but at the same time pressed into service public halls, baths, dwelling houses, and pagan temples, so that each of these structures had some influence in the development of the later church plan.

WALLS

154. The walls were constructed somewhat according to the old method, of rubble and concrete, and were faced with some decorative material or plaster. Internally, glass mosaic was largely used.

ROOFS

155. Roofs of wood covered the nave and were supported by ordinary trusses, which gave them a slant for the shedding of water and presented an opportunity for the decoration of the visible framework within. The aisles were also covered with a wooden roof, though sometimes vaulted, and the apses at the end were generally domed over and lined with mosaic.

COLUMNS

156. In the early Christian buildings, the columns were taken from Roman constructions that had fallen into decay, or that were purposely destroyed to obtain building material. These early Christians were not good craftsmen and were unable to create anything original for themselves. Thus, today, we find in nearly all of the most important early churches of Rome, columns taken from ancient Roman buildings. These columns were frequently different in diameter, design, and order, so that no uniformity was attained.

OPENINGS

157. The doors and windows were usually semicircular-headed, after the pagan model. The windows were small and were confined to the aisles of the church. The nave of the church was lighted by a series of small windows high in the nave wall, forming a clearstory above the aisle roof, which thus established a detail that afterwards became characteristic of the early Gothic church.

MOLDINGS AND ORNAMENT

158. The moldings are of the crudest possible character—unskilled attempts to work out the Roman types resulting in very crude effects.

Color predominated in all the decorative attempts, most of the effects being obtained by mosaic. Long friezes of figures above the nave arcades and between the clearstory windows were executed in mosaic. The background is usually of gold, and the figures are simple and well suited to the position they occupy, but the method of working is crude, no attempt being made at neatness or uniformity in joints and bedding. Such ornament as can be derived from the laying of geometrical patterns and mosaic pavements are characteristic of the general ornament of this period.

159. Taken as a whole, the early Christian period represents the transition from the ancient to the modern. It is not a style borrowed by itself and possesses none of the characteristics of an individual style, but it is the stem from which branched the two great styles of the middle ages—Byzantine in the East and Romanesque in the West.

A clear understanding of this period is necessary in order that the student may follow closely the development of the two subsequent and contemporary styles. These two styles are destined, under the peculiar religious and political influences that followed, to blot out all memory of the pure classic forms, for a thousand years.

REVIEW EXERCISES

1. Between what dates is the period of early Christian architecture included?

2. What are the characteristics of the basilica plan?

3. When was Christianity made the state religion of Rome?

4. What were the characteristics of early Christian buildings?

5. When did the individual countries of Europe begin to form under separate governments?

6. In what countries of Europe were there Roman remains to influence later architectural constructions?

7. Under what rulers or statesmen were the greatest architectural developments: (*a*) in Greece? (*b*) in Rome?

8. Write a short essay upon the development of architecture and ornament from the days of early Egypt to the beginning of the 4th century A. D., illustrating where necessary with pencil sketches or tracings.

HISTORY OF ARCHITECTURE AND ORNAMENT

(PART 2)

MEDIEVAL ARCHITECTURE

1. From the early Christian architectural style developed the two great structural systems of the middle ages—the Byzantine in the East and the Gothic in the West. The former was based directly on Roman designs rather than on a transitional style that intervened between the fall of Rome and the perfection of the system, whereas the Gothic style was slowly evolved from the Romanesque, which in itself was developed from the early Christian endeavors to use the Roman structures for their Christian ritual.

The Byzantine style was at once rich with colored marbles, elaborate mosaics, and tiled pavements, as Byzantium was the capital of the Eastern Empire and a rich commercial center, with the artistic spirit of Greece and the splendor and extravagance of Rome ever before it as models of architectural style, whereas the early Gothic style was economical and bare, depending for its beauty entirely on the proportions of its parts and the relative value of its masses. Gothic architecture developed in parts of Europe where the splendor of Rome had failed to reach, and the people were in no position to try to rival the wonders of the capital city, yet they accomplished this without knowing it.

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BYZANTINE ARCHITECTURE

(395 A. D. to 1453 A. D.)

INFLUENCES

2. Geographical.—The ancient city of Byzantium, now known as Constantinople, lies between the Black Sea and the Sea of Marmora, as can be seen by referring to the map shown in Fig. 1. The Strait of Bosporus washes its shores,

FIG. 1

and thus it occupies one of the finest commercial sites in Europe.

It was originally called "New Rome" for the reason that when Constantine became emperor he changed the capital of the Roman Empire to the Oriental city on the Bosporus, which, like its predecessor, was built on seven hills between two great waterways.

3. Geological.—Byzantium possessed no good building materials. Stone was scarce, and there was no clay suitable for brickmaking. Therefore, the building materials of the capital of the Eastern Empire had to be imported from quarries across the Mediterranean.

4. Climatic.—Byzantium was a hotter city than Rome, so that on settling there the Romans changed their habits and methods of building to suit the Oriental conditions and climate.

5. Religious.—In 324 A. D., Constantine established Christianity as the religion of the state, and this brought an important influence to bear on the developing architectural style. When, in 395 A. D., the Roman Empire was divided into the Empire of the East and the Empire of the West, a division of the Church followed, owing to a difference of ideas concerning ecclesiastical rules governing the introduction of sculptured portraits in church architecture, and other practices. The Eastern Church disapproved of the use of any form of carved images. Painted figures in the decorations were tolerated, but sculptured ones were not. The Western Church insisted on graven images of the saints and martyrs, which the Eastern Church held was idolatrous. Consequently, when the eastern emperors lost all power in the Western Empire, the Eastern Church became an independent establishment.

6. Political and Historical.—Constantine's system of government was an expansion of the despotic methods of the Cæsars of Rome (see Roman Architecture, Historical Influences, *History of Architecture and Ornament*, Part 1), and the removal of the capital from Rome to Byzantium enabled him to control the valuable commercial advantages of the latter city. At his death, however, rival emperors claimed the throne and disputes arose in the Church through parties siding with the different claimants, until finally, in 395 A. D., the empire was divided into two parts. One division, comprising Italy and the western provinces of Gaul and Spain, was then known as the Western, or Latin, Empire,

under Emperor Honorius, and the other, which included the Greek and Oriental civilizations of Hellas, Macedonia, Thrace, and Asia Minor (see map of Greece, *History of Architecture and Ornament*, Part 1) was known as the Eastern, or Byzantine, Empire, under Emperor Arcadius, a brother of Honorius.

7. Byzantium was originally a Greek colony, and it retained traces of Greek influence in its art. Byzantine architecture developed into a distinct style after the removal of the capital from Rome to the banks of the Bosporus, and this style included not only buildings in Byzantium itself, but also those erected in cities under the influence of the Eastern Empire and the eastern branch of the Church.

During the reign of Justinian, about the middle of the 6th century, the Eastern and Western Empires were reunited under one emperor for a short period, and during this reunion Byzantine influences spread into Italy and Sicily and permanently marked buildings erected during that period. The city of Ravenna (see Fig. 25) grew in importance owing to the fact that the emperor resided there in preference to Rome, and it was afterwards created a *See*, or town in which the bishop of the Church resided. The creation of a See was a matter of vast importance in the development of a town. Churches were built wherever a congregation or parish required one, but where a cathedral was erected the town became a See and the seat of the bishop's jurisdiction. The building of the cathedral not only brought a multitude of craftsmen to the town, but it gave the community importance politically, ecclesiastically, and commercially. After the Western Empire was claimed by the Goths, in 476 A. D., Ravenna remained the residence of the Gothic kings and rivaled Rome in importance. From 539 to 572 A. D., Ravenna was the residence of the governors appointed by the Byzantine emperors, and the Byzantine style flourished there until Constantinople was taken by the Turks in 1453. Venice in Northern Italy, Monreale in Sicily, and other cities in Greece and Russia were especially influenced by the Byzantine style.

CHARACTERISTICS

8. The chief characteristic of the Byzantine style centers in the new principle of design arising from the development of the dome as a system of roofing over the areas of the plan. This point should be clearly understood, as it was the dome in the East that led to the development of the Byzantine style, and the vault in the West that gave rise to the Romanesque and Gothic styles. The change developed was from the original Roman forms, but was gradual and progressive, and in the course of two centuries Byzantine architecture existed as a style by itself.

Generally speaking, a Byzantine building consisted of a brick construction no more architectural in its details than the concrete constructions of the Romans. The walls were sheathed with rich marbles or bricks, and the domes were decorated with brilliantly colored glass mosaics against a golden ground. The heart of the wall was occasionally built of concrete, as in the Roman method, and the bricks used simply as a surface treatment. The bricks, however, were not laid in regular courses as in the Roman and modern methods, but were set in geometrical patterns to form a fret-work, chevron, herring-bone, or other design that added variety to the appearance.

The dome, however, is the characteristic detail of the style. At Rome, domes had been constructed only over circular and polygonal buildings, but in Byzantine work are found square apartments that are successfully domed by bringing the angles together to form a **pendentive.**

9. In Fig. 2 is shown a diagram of the Byzantine system of construction, *a b c d* being the rectangular plan that is to be covered by a circular dome. Four heavy masonry piers *a e*, *b f*, *c g*, and *d h* are constructed at the four angles of the plan, the spaces between them being spanned by four arches, as *e k f*, *f l g*, etc. Thus far the construction does not differ widely from that practiced by the Roman architects; but in order to dome the enclosed area, the angles were also arched

over until, at the crowns of the first arches, the plan became circular, as at *k l m n*. The inside of the spherical triangles thus formed at *e n k*, *f k l*, etc. are called *pendentives*, and are as characteristic of the Byzantine style as is the dome itself. Over this circular opening *k l m n*, the dome *o p q* was constructed, resting directly on the pendentives in the earliest structures, but in the more advanced buildings raised on a cylindrical superstructure, as *n o*.

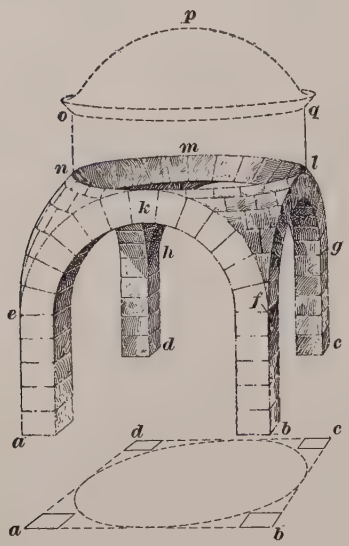


FIG. 2

10. Domes and semidomes covered all spaces, and were built of light, porous stones, such as pumice. Some domes were constructed of terra cotta or light pottery, thus characterizing the architecture by the introduction of brick and other clay compositions. The bricks were large and flat and were laid up in a system derived not from Rome but from Asia. Small domes were grouped around the larger ones, giving a picturesque effect, and no attempt was made to disguise these forms externally. One can readily see from the exterior of a building exactly what the interior arrangement presents (see Figs. 3 and 5). Here, then, is a contrast to the Roman system, although the style was based on a similar principle. The columns and entablatures could be stripped from the Roman buildings without injuring their construction, but if the Byzantine buildings were stripped of their decorative features, exterior vaults, and domes, the construction itself would be destroyed.

The classic orders were dispensed with. New capitals developed that still bore some relation to Roman prototypes, but were Oriental in character (see Fig. 11).

11. The procedure for the erection of a building was a most simple one. The plan being determined on, the first consideration was to collect the marble shafts that were to support the interior walls and galleries. It was absolutely necessary that the quarries from which these shafts were to be obtained be thoroughly understood before the foundations were commenced, for on the length that these columns could be quarried depended the height of the building. The details of the columns therefore became one of the first considerations, and when that was settled, the body of the structure could be proceeded with. The shell representing the outer and inner faces of the wall of the building was built of narrow bricks carefully laid in mortar, and when thoroughly dry this shell was filled in with concrete and sheathed with marble. The great piers that were to support the pendentives under the domes were next constructed; then the domes were turned over the tops and their soffits overlaid with mosaic.

The problem was essentially one of roofing. The plan was laid to suit the purposes involved. A fireproof roof of stone must then be constructed to render the building permanent. This heavy roof had to be supported and demanded strong columns and heavy piers for that purpose. Decoration formed no part of this fundamental architectural problem. These essentials had to be met before any consideration of ornament could be entered into. When form of plan, columns, and roof were determined, however, the question of decorative detail asserted itself. The supporting columns could be made ornate by sculptured capitals and polished shafts. The flat side walls could be encrusted with costly and elaborate marbles, and the hollow soffits of the domes could be overlaid with mosaic.

EXAMPLES

12. Byzantine architectural examples consist mostly of churches and baptisteries. A few of the former follow the basilican style, but the majority are based on the circular and polygonal plans of the Roman and early Christian tombs.

13. Church of Hagia Sophia.—The great church of Hagia Sophia, Fig. 3, built by Emperor Justinian in 532 A. D., is the earliest monument purely Byzantine in style and one of the really great buildings of the world. A peculiarity of this monument and its style is the fact that it presents so perfect an example of an original style with so little transition toward that style.

The emperor declared that he would erect a church, "That should be the grandest monument ever built by man," and the governors of even the most distant provinces of the empire were ordered to ransack all the ancient Roman buildings for sculptures, precious marbles, and works of art, to be used in this edifice. Eight columns of pure white marble were brought from Palmyra, and eight more of deep-green marble were stripped from the temple of Diana, at Ephesus, and shiploads of costly relics were brought from all sections of the empire to become a part of this great structure.

14. The plan and construction of this edifice is no less remarkable than the scale and treatment of its interior decoration (Figs. 4 and 5), and it stands to Byzantine architecture as the Parthenon stood to the Greek and the Pantheon to the Roman. Unfortunately, this church is now converted into a Mohammedan mosque, and the severity of the Moslem religion required that its beautiful interior decorations should be covered from sight by repeated applications of whitewash over which Arabic inscriptions were inscribed.

The plan of the church of Hagia Sophia, as shown in Fig. 4, was an adaptation of the Basilica of Maxentius (see Fig. 80, *History of Architecture and Ornament*, Part 1), and

Fig. 3

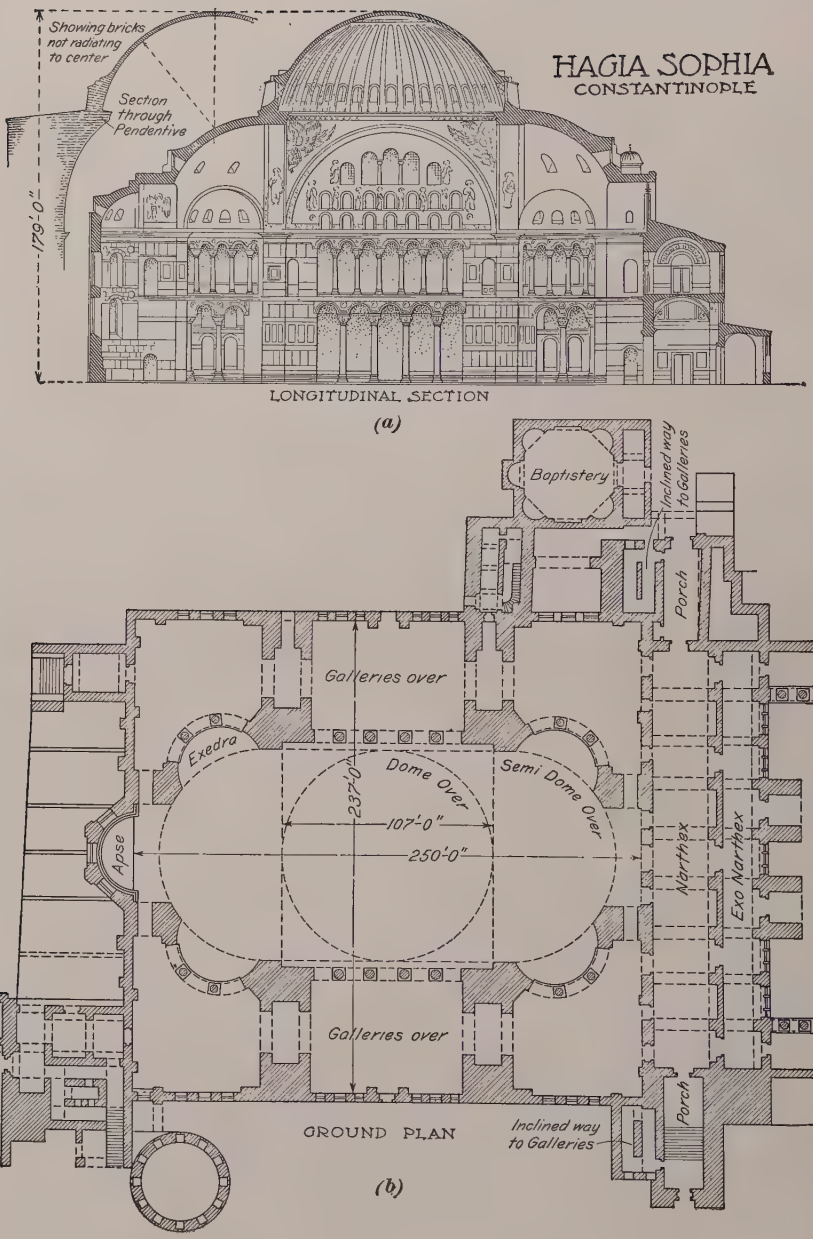

HAGIA SOPHIA
CONSTANTINOPLE
Showing bricks not radiating to center
Section through Pendentive
179'-0"
LONGITUDINAL SECTION
(a)
Baptistery
Inclined way to Galleries
Porch
Galleries over
Exedra
Dome Over
Semi Dome Over
237'-0"
107'-0"
250'-0"
Apse
Narthex
Exo Narthex
Galleries over
GROUND PLAN
Inclined way to Galleries
Porch
(b)

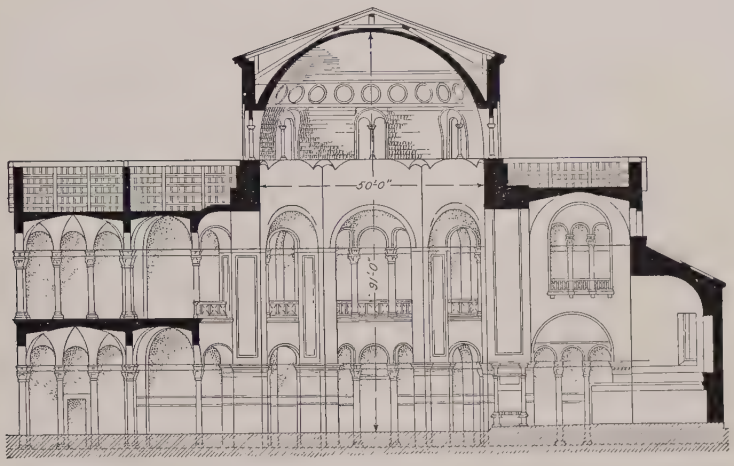
FIG. 4

FIG. 5

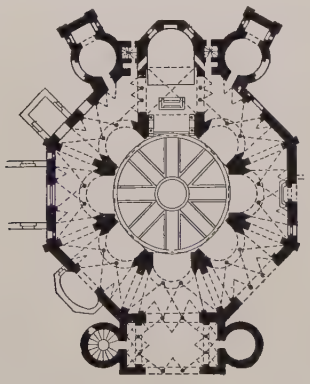
consists of a central square 107 feet on each side, at the corners of which are four massive piers 25 feet in thickness. These piers are connected above by semicircular arches supporting a dome 107 feet in diameter, as shown in the interior view, Fig. 5. It will be well to compare the construction here illustrated with the diagram shown in Fig. 2. East and west of this dome are great apses crowned with semidomes, out of which are further extensions also domed over. An oval-shaped nave 250 ft. × 107 ft. is thus established, around which aisles 50 feet wide are constructed, thus approximately reducing the total structure to a square. The square central space is crowned 179 feet above the floor with a dome that in itself is over 47 feet in height, being less than half a sphere. The semidomes over the semicircular extensions to the nave are constructed so that their crown strikes the base of the main dome and acts as a brace or buttress against it, as shown in Fig. 4 (*a*).

15. Church of St. Vitale.—As has already been mentioned, the city of Ravenna was greatly influenced by the Byzantine style, and here is located the church of St. Vitale, the plan and section of which is shown in Fig. 6 and the interior in Fig. 7. The character of the Byzantine interior treatment can be better studied here, as no infidel hand has whitewashed it over. Rich mosaics and rare marbles cover every available wall space from the tile mosaic floor to the soffit of the hemispherical dome. The interior is lighted through eight mullioned windows that pierce the drum of the dome. The drum is supported on eight arches; each of which is closed on the outside by a semidome upheld by two columns. The capitals of these columns are marvelous products of the carvers' skill. [See Fig. 12 (*b*).] This edifice was modeled after the temple of Minerva Medica, at Rome, and is octagonal in plan, the inner octagon being 50 feet in diameter and the outer one 110 feet.

16. Church of St. Mark.—In Fig. 8 is shown the church of St. Mark, at Venice. This structure was erected at the end of the 11th century, and shows remarkable



(*a*)



(*b*)

FIG. 6

FIG. 7

FIG. 8

Byzantine characteristics that were undoubtedly brought to Venice through geographical influences, as this city was one of the connecting links in the commerce between Byzantium and Western Europe.

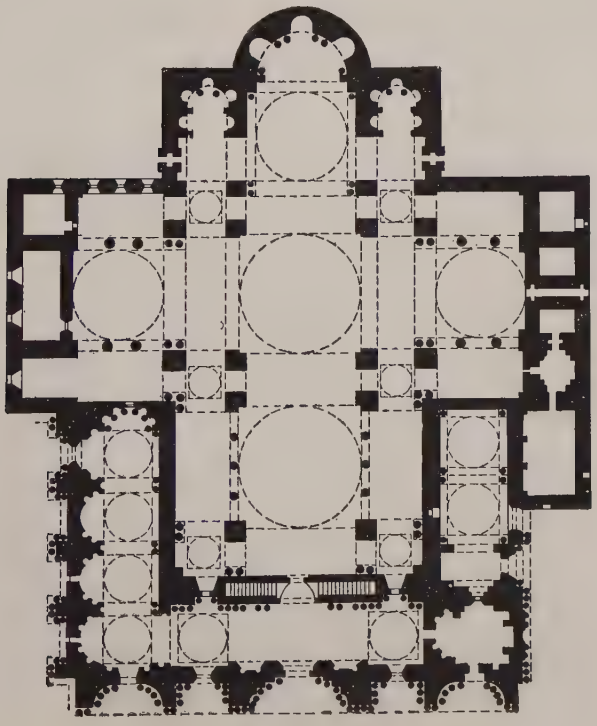
The plan of St. Mark's, shown in Fig. 9 (*b*), presents a Greek cross with four equal arms, over one of which and over the intersection are turned domes 32 feet in diameter, whereas a smaller dome exists over three of the arms. The plan also shows that the great piers supporting the central domes are pierced by archways in both directions, subdividing them into four smaller piers on the ground plan. On the western arm of the crucial plan, an arcade forms a vestibule around three sides, making this portion of the plan nearly square.

In the section shown in Fig. 9 (*a*) a low masonry dome over the center and side arms may be seen, together with the false and greatly elevated wooden domes erected to serve as the roof and at the same time give exterior effect. These wooden domes are of later date than the original construction.

The interior of St. Mark's, Fig. 10, is richly veneered with colored marble and mosaic. The latter is used almost exclusively in the upper parts of the walls and the interior of the domes. This mosaic presents illustrations depicting scenes from the lives of the saints, portraits of the martyrs, and scriptural subjects, all set off against an elaborate background of gold. The interior of St. Marks appears richer than St. Sophia, but this is due to the fact that all the elaborate mosaics and decorations of the latter were destroyed or painted over when the Mohammedans secured possession of the city.

17. Other Byzantine Structures.—In Greece there are many small but beautifully executed buildings in the Byzantine style, and the cathedrals of Moscow, Keif, and Novgorod, in Russia, are developments along these same lines.

(*a*)



(*b*)

Fig. 9

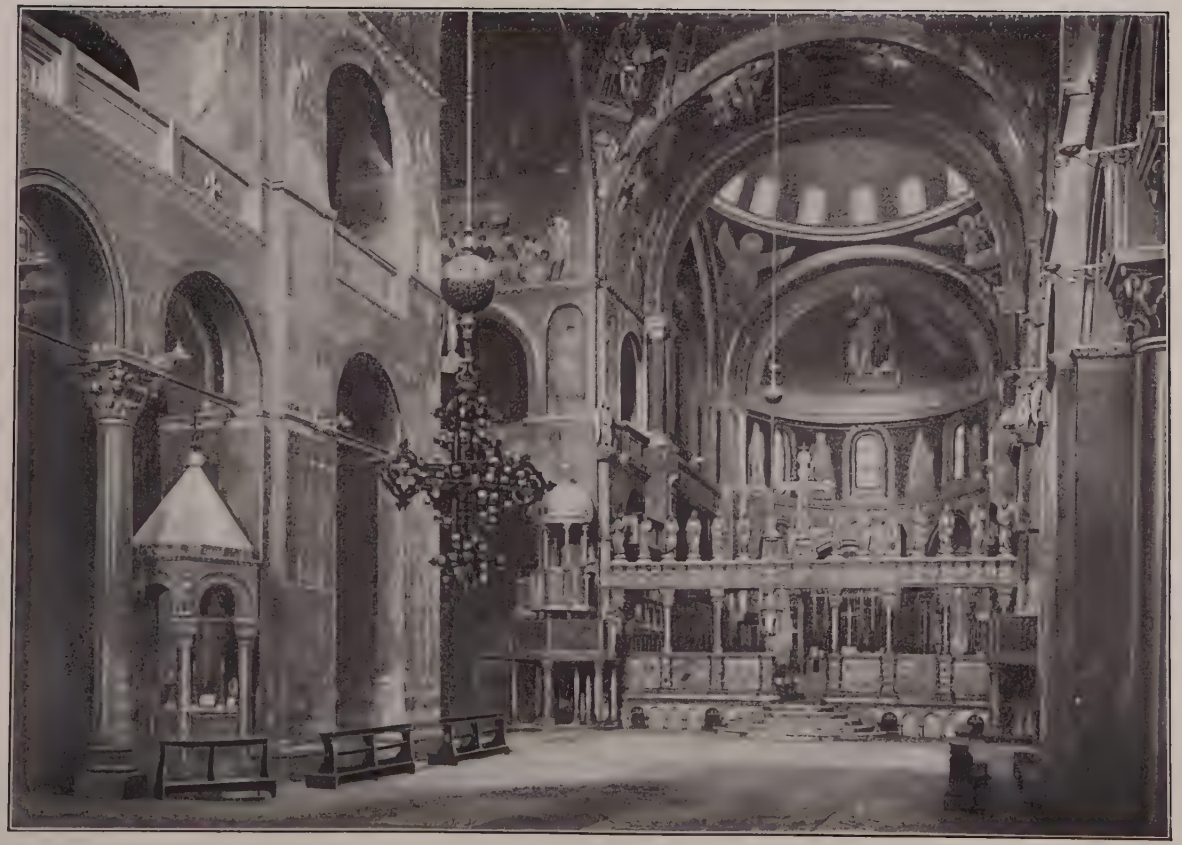


FIG. 10

ANALYTICAL STUDY

PLANS

18. The characteristic Byzantine plan presents a square central space covered with a dome supported on pendentives, as in Figs. 2, 4, 9, and 10, and the purely structural character of the pendentives is clearly shown in Fig. 38. On each of the four sides of the central space arms extend, thus forming a Greek cross. The whole is enclosed by walls supporting the galleries, thus making the plan nearly square. Compared with the early Christian basilica, it is found that the Byzantine church tends toward a condensed plan and effective interior height, the crowning feature being the central dome, around which smaller domes, or semidomes, are grouped. The early Christian basilicas presented a long and narrow plan, by which an effective perspective of interior columns was obtained, together with a dominating influence of horizontal lines.

WALLS

19. The walls consisted of an exterior and interior shell filled in with concrete. The interior shell was elaborately decorated with marble and mosaic, and occasionally a decorative effect was attained by laying the brick of the enclosing shells in chevron, herring bone, and other ornamental patterns.

ROOFS

20. The main portions of the buildings were covered by a series of domes, usually appearing externally in their actual form. Sometimes, the domes were built of pottery or terra cotta, this light material causing little thrust against the walls. The early domes were lower than a hemisphere, Fig. 6, but later they were raised on a drum, which was pierced with a series of windows, Fig. 7.

COLUMNS

21. As in the early Christian structures, the Byzantine columns were first taken from ancient buildings. The supply in the East, however, was limited, and it soon became exhausted. Thus, the necessity of designing new columns presented itself more quickly than it did in the West. The shafts were of rich marbles turned from a single piece and polished to bring out the veinings. The capitals originally in design show the influence of the Roman orders in many cases, Fig. 11.

OPENINGS

22. Semicircular window heads are general throughout the Byzantine style, but segmental arches and horseshoe openings are occasionally seen.

The windows are small and grouped, rather than scattered. The extensive application of mosaic for decorative effects on the broad wall spaces, dome soffits, and pendentives, fulfil the place occupied by stained glass in the Gothic style. Large windows were not practical in the Byzantine churches. The climate, too, had much influence on this, as it was warm and sunny, necessitating numerous small openings that would tend to keep out the heat and at the same time give the necessary light. Delicate carving and stained-glass effects were therefore impractical, as there was not sufficient light to set off the former nor sufficient window space to display the latter.

MOLDINGS

23. The moldings were unimportant and were used simply to separate spaces of elaborate mosaic work without any attempt to develop pleasing forms of contour, or outline. The few moldings that were used were based on classic models, but the classic moldings were not followed with any degree of fidelity. There was no set system of moldings as in the classic or later Gothic styles.

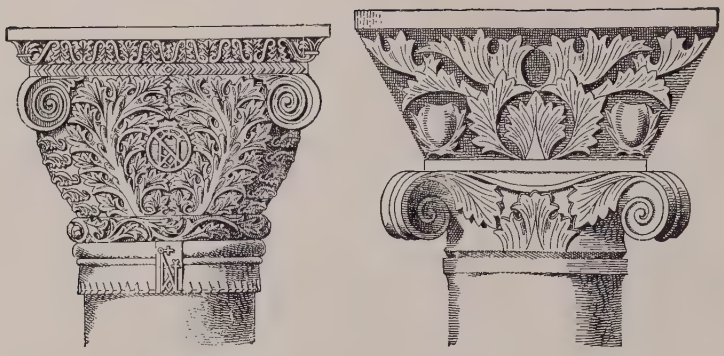
ORNAMENT

24. In the East, around the city of Byzantium, architecture was influenced by the art of Assyria and Persia. In fact, its entire character became tinged with an Oriental spirit, and this spirit in the course of three or four centuries did much to develop a new and entirely different style of art and architecture, known as *Byzantine*.

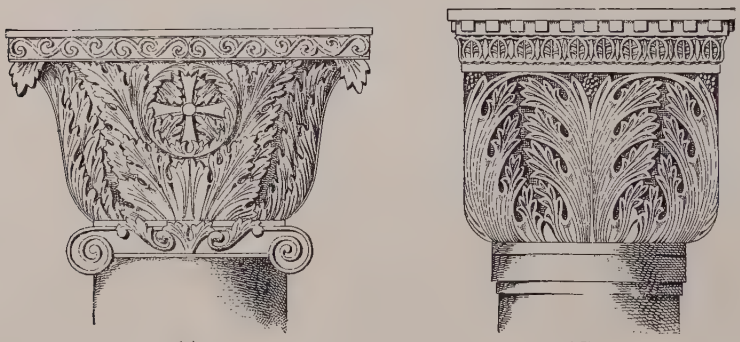
The scheme of ornamentation was most elaborate. The richest marbles that could be procured were used for the lower portions of the walls, and the natural veinings were arranged so as to form geometrical patterns. Glass—mosaic, and symbolic figures representing groups of saints and signs of the Evangelists were inlaid against a golden ground. The small amount of carving used was in low relief, and the effect was frequently produced by sinking portions of surfaces. The acanthus leaf was cut in sharp relief, with the holes between the lobes deeply drilled. The style of the acanthus carving was more Greek than Roman.

One of the strongest characteristics of Byzantine ornament, compared with classic ornament, is that the design seems to be cut *into* the surface instead of being applied to it, the surface always remaining flat and the pattern so cut as not to break its outline. There is a characteristic Grecian influence pervading all Byzantine ornamentation, which would naturally be the case, as Byzantium was originally a Greek city.

25. The capital shown in Fig. 11 (*a*) is from one of the columns in the first tier of arches in the church of Hagia Sophia, at Constantinople. The scrolls in the upper part of this column undoubtedly have their origin in the Ionic order, and, though the entire capital is decorated with the conventionalized acanthus leaf, it is widely different from any Roman model. Here the block of the capital is sound and heavy, and at its bottom is a foliated ring that seems to bind it together, while the carved leafwork grows out of the top of the column and enters materially into the construction of the capital itself.

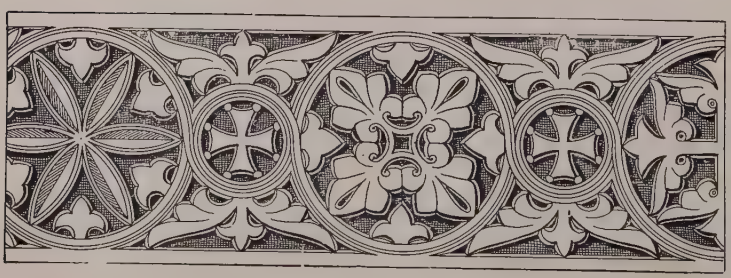


(*a*) (*b*)



(*c*) (*d*)

(*e*)



(*f*)

FIG. 11

In another Byzantine capital, shown in (*b*), the place usually occupied by the abacus is filled by a heavy semi-pyramidal form on which the ornament seems to be applied as a surface decoration more than a component part of the construction.

In (*c*), a capital from St. Mark's Church, at Venice, the volutes at the top of the column, the shape of the capital as it swells out to the abacus, and the general character of the details suggests the Roman Corinthian order.

In (*d*) is shown another example of Byzantine capital, from Italy, that is even more freed from Roman influence than that of the previous example. The long, elliptical curves formed by the leaves, the sharp-pointed lobes, and the deep indentations are all indicative of its Byzantine origin.

26. The *running ornament* is illustrated in Fig. 11 (*e*). The leaf form here is thoroughly conventional, and, though tending slightly toward a scroll, is governed by a continuous wavy line, from opposite sides of which the leaf forms branch.

In (*f*) is shown an example of geometrically arranged running ornament from the church of Hagia Sophia. The main geometrical forms, as will be observed, are circles. These circles, however, are not formed complete in themselves, but result from the crossing and intersection of two wavy lines precisely the same in general character as the wavy line that forms the governing element in (*e*). In (*f*), however, instead of branching foliage from opposite sides of the lines, geometrical figures are arranged within, and foliated forms with the cross of St. George are used to form prominent details of the design.

27. The capital shown in Fig. 12 (*a*) is from the church of St. Vitale, Fig. 7, at Ravenna. The peculiar-looking birds on the upper part, as well as the sharply indented foliage, are characteristic of this style, as is also the geometrical pattern and the wandering-vine border line, throwing off its leaves on alternate sides.

(*a*)

(*c*)

(*b*)

FIG. 12

That the capital of the column is cut in full relief is clearly shown, as the light shines through the screen work into the stone interior. The dark portions of the capital were originally gilded, and must certainly have presented a most remarkable effect.

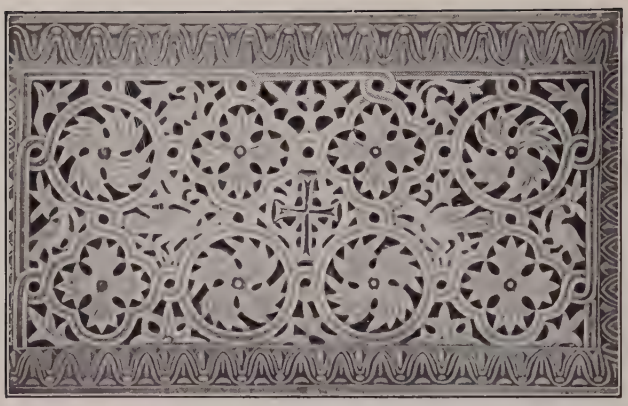
Over the balcony above the altar in Fig. 7 are three arches supported on columns, details of which are shown in Fig. 12 (*b*). The walls, soffits, and spandrels of the arches are laid in mosaic.

28. In giving examples of Byzantine ornament, nothing could be more characteristic than the stone panels herewith illustrated. The style of the ornament itself, the character of the carving, and the development of the geometrical pattern are all details that are shown here in a most characteristic Byzantine form.

29. The pierced screen shown in Fig. 13 (*a*) is from Ravenna, and illustrates the geometrical pattern based on an arrangement of circles, in which is carved the typical Byzantine leaf. The cross outlined in the center was emphasized in the original by a plating of gold, and the spaces around the foliage were filled with birds, the peculiar modeling and conventional outline of which are characteristic of the Byzantine style. Another characteristic of the style, shown clearly in this illustration, is the sharp, angular cutting of the leaves, the deep circular and elliptical openings between the lobes of two adjacent leaves, and the tendency of the whole panel to appear in high relief on a dark ground rather than to be pierced through entirely.

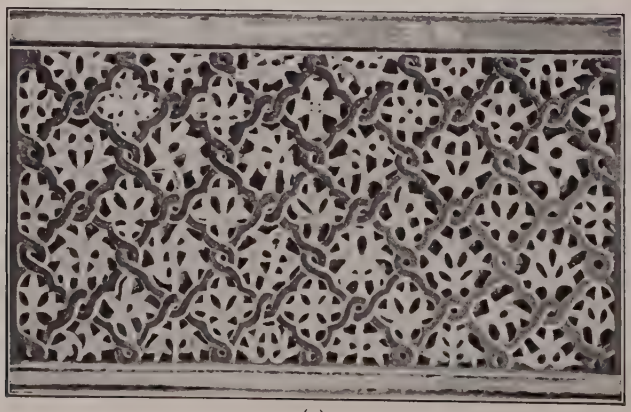
In (*c*) is shown another screen of the same character. In this example, the interlaced bands that form the geometrical outline of the foliated ornament were originally gilded, and the leaf forms carved between them are similar to those in (*a*).

30. The screen shown in Fig. 13 (*b*) is from St. Mark's, at Venice, and its design is based on identically the same motifs as the screens that have already been studied. The carving, however, though in high relief, does not pierce the screen, and the border of the panel, as well as the treatment



(*a*)

(*b*)



(*c*)

FIG. 13

of the foliage within the panel, shows a highly developed Byzantine feeling. However, the influence of its proximity to Rome on the treatment of the scroll forms is apparent. In the central part of the panel the running vine, with its leaves branching from each side is missing, but there is a partly controlled tendency to grow one scroll out of another —a tendency that is so well kept in submission that it does not materially affect the delicacy of the design.

31. In the same church is found a panel, Fig. 14 (*a*), the rounded forms of which are not often found in this style. The severe conventionalism of the foliage treatment is characteristic, however, as is also the preservation of balance and symmetry. On one side, the vine runs off the panel both at the top and the edge, and on the other side, it runs off the panel at the top only. One of the two central leaves extends over the molding of the panel frame; the other is carved entirely within it.

32. Fig. 14 (*b*), however, shows a trend in a different direction. Here the openings in the screen are larger, the exterior portion of it being outlined with a design undoubtedly derived from the Greek fret, while in the center a large Latin cross divides the panel into four smaller rectangles. It will be well to observe the running foliage around this panel, and its branching leaves and fruit, alternately from opposite sides, and to note the difference between this style of treating foliage and that of the Roman and Greek artists, where continuous foliage was accomplished by growing one spray, or stem, out of a calyx, or cup, from which a scroll emanated.

33. In Fig. 12 (*c*) is shown a well at Venice, the details of which illustrate clearly the strong, bold, outline effect characteristic of Byzantine carving. The guilloche border around the top and the leaves patterned after inverted anthemions are suggestive of classic origin, but are treated with such strong Byzantine effect that the classic taint is fairly obliterated.

(*a*)

(*b*)

FIG. 14

(*a*)

(*b*)

(*c*)

(*d*)

(*e*)

FIG. 15

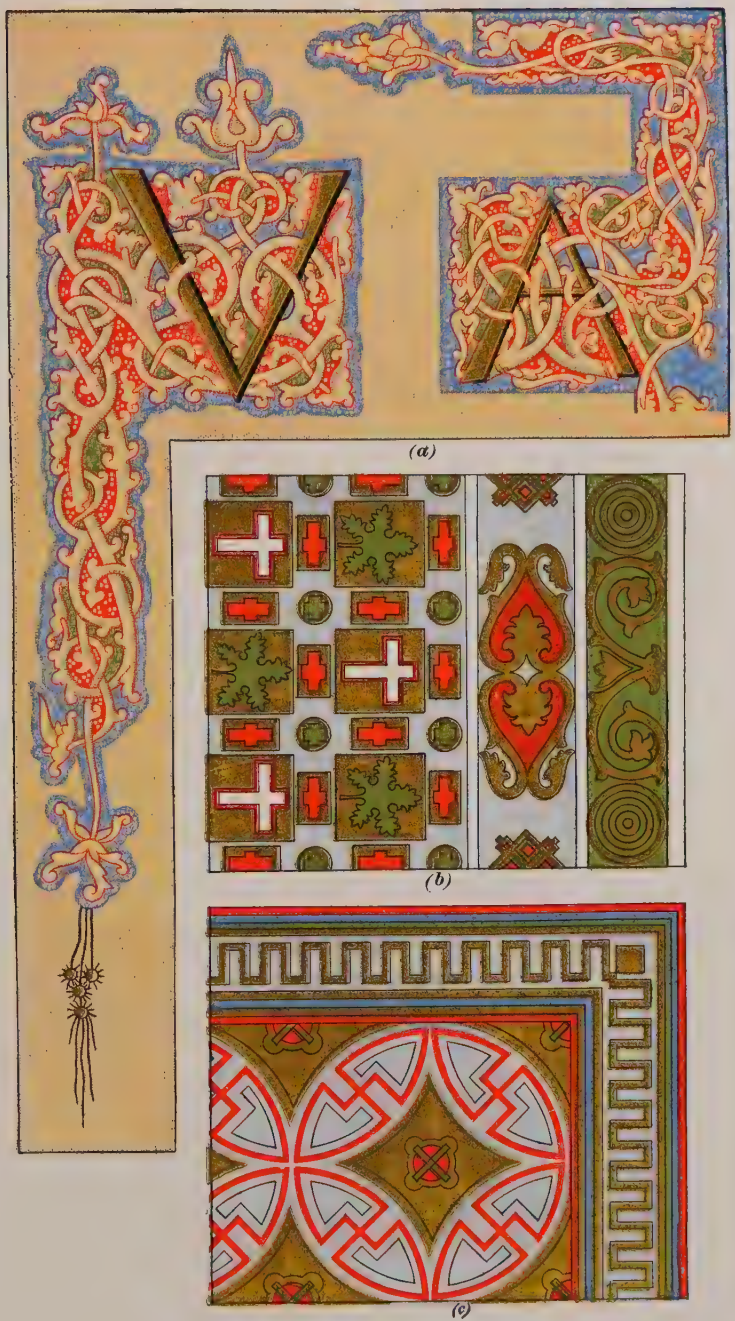


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FIG. 16

34. Color in Byzantine ornament was a very important factor, as the walls of the churches were richly overlaid with mosaics and frescoes in which the color theme was most magnificent. Gold was largely used for backgrounds and took the place of yellow, while the other two primaries, red and blue, formed a part of the theme.

The gold-and-black borders shown in Fig. 15 (*a*), (*b*), and (*c*) are characteristically Byzantine both in their geometrical construction and color contrasts. The three-leaved sprig conventionally and symmetrically introduced with the circle is a very simple combination that has been endlessly varied in different designs. It will be well to study borders (*a*) and (*b*) carefully and to observe how similar they at first appear, and yet on careful scrutiny how materially they differ. The border at (*c*) being absolutely symmetrical, can be used to advantage both in a vertical and in a horizontal position. These interlacing forms, based on tangent and intersecting circles, formed an important element in the elaborate illuminated manuscript designs of this period.

In (*d*) is shown a wall decoration in gold against a buff ground. The design is worked out in the flat with extreme conventionality, still introducing the circle as the unit of repetition. The decoration at (*e*) is a late example in which the hexagon is used as the unit of repetition.

35. Fig. 16 (*c*) shows an example of ceiling decoration from the church of St. George, at Thessalonica. The peculiar outline of the device adjacent to the four sides of the interior rectangle is suggestive of Arabian origin, and is exceedingly ingenious in its method of preserving symmetry and preventing awkward repetition.

In (*b*) is shown an example of wall decoration from the same edifice. The effect is very rich, and the arrangement of the rectangles and smaller circles shows a knowledge of surface division that is well carried into effect. The coloring is Byzantine, and worthy of careful study. Though brilliant, it is never glaring; the hues are selected to harmonize and to produce a soft bloom effect at a distance.

RISE OF THE SARACENS

(622 A. D. to 755 A. D.)

36. It will now be necessary to turn aside for a moment to consider a remarkable period in history when an Oriental nation invaded Europe and established its customs and religion where another race and another faith had previously existed for several centuries.

Mohammed, a rich merchant much respected in Arabia, was the founder of this new religion. When about 40 years of age he announced that he had been chosen by God to reform the faith and practices of the Arabian nation. He acknowledged both the Jewish and Christian beliefs as sent from God, but claimed that he had received later and more complete inspirations from divine sources, for the benefit of his own people. Thus, he gave his countrymen a religion that united the scattered Arab tribes into one homogeneous nation. His native town of Mecca, however, soon denounced him as an imposter, and he and his followers were obliged to flee for safety on July 15, 622 A. D. This flight, termed "Hegira," is the beginning of the Mohammedan era from which all their dates are reckoned.

Mohammed took refuge at Medina, where he made a number of converts. With increase of followers the religious reformer became a red-handed soldier, and at the end of 10 years, conversion to Mohammedanism had been forced on the whole Arabian peninsula. As the Arabs were about to force this belief on other nations, Mohammed died, in 632 A. D. His successors, however, endeavored to carry out the campaign, and began a long series of wars and invasions, until Mohammedanism was spread over a large part of Asia, Africa, and Southern Europe.

37. The Arabs, or Saracens, as they were called, met with comparatively little resistance in Oriental districts, as

those countries were a part of the Roman Empire in which Christianity and Roman law had taken little hold. Thus, the great Eastern Empire was shorn of all its possessions, and in the far East, all the lands from Persia to India were added to the Moslem Empire.

In the West, however, the Saracens met with stout resistance. Constantinople was besieged for 8 years without result; and 40 years later a similar siege met with failure. In Northern Africa, too, there was great resistance, but finally the whole Northern Coast was subdued, and in 710 A. D. the Mohammedans crossed from Africa into Spain and established themselves at Gibraltar. They then overran the whole peninsula and established a kingdom that lasted 700 years. They crossed the Pyrenees and entered Southern France with the intention of adding that country, and possibly all Europe to their empire, but in this they were unsuccessful. In 732 A. D., near Tours, France, the invaders were met by a powerful Christian army under Charles Martel, and here a fierce battle raged for 7 days. The Saracens were hopelessly defeated, and the progress of Mohammedan arms in Europe was forever checked. Had this not been accomplished the entire history of the world might have been changed. To Charles Martel then we owe the preservation of Europe for the Christian kingdoms and to the descendants of Charles Martel we largely owe the permanent establishment of the Church universal.

This great Saracenic Empire, extending from India to Spain, was for a short time under the rule of a single emperor, or caliph.

38. The influence of this Saracenic invasion was in reality beneficial. During the dark, feudal ages, when all Europe was sunk in the grossest ignorance, the Oriental Saracens were actively engaged in the cultivation of science and art. The libraries and schools at Cordova, in Spain, and at Bagdad, in Persia, gave to Europe all that was original, during the middle ages, of medicine, mathematics, and physics.

These people also developed an architecture of their own that is rich in ornament and decorative effect. This will not be considered, however, until the development of the medieval styles is finished.

REVIEW EXERCISES

1. What was comprised in the Byzantine Empire?

2. What religious influences affected the Byzantine style?

3. When did the Byzantine Empire come into existence?

4. What are the leading characteristics of the Byzantine style?

5. Of what character of buildings do the Byzantine examples consist?

6. (*a*) What is the principal structure in the Byzantine style? (*b*) When was it built?

7. In what way did the Byzantine system of building walls differ from the Roman system?

8. What influences affected the development of Byzantine ornament?

9. Make a drawing in pen and ink of a Byzantine capital.

10. Make a drawing in color of Byzantine running ornament. Drawings should be large enough to show details clearly and must be executed on sheets of white paper 9 inches by 12 inches.

11. (*a*) Who were the Saracens? (*b*) In what way did they affect the history of Europe? (*c*) During what period did they exercise the greatest influence?

ROMANESQUE ARCHITECTURE

(800 A. D. to 1200 A. D.)

INFLUENCES

39. Geographical.—While the Byzantine art was settling itself into a fixed style in Eastern Europe the Romanesque was developing in the West. As the different countries of Europe began to assume character under individual rulers, the architecture that developed in those countries possessed peculiarities that were purely geographical in character. The Romanesque architecture of Italy was greatly influenced by Byzantine art, and in many cases (as at Venice and Ravenna) it is difficult to distinguish between the Romanesque and the Byzantine. Spain and France being far to the west, however, the style was influenced less by Oriental art, and in England, which is separated entirely from the mainland, it developed quickly into an entirely new style founded on the old architecture of the Romans but developed without any foreign influence.

40. Geological.—Although Romanesque architecture pervaded all of Western Europe from the fall of Rome to the end of the 12th century, one of the strongest characteristics of the style in general is the use of materials that marked its individuality in each particular country.

41. Climatic.—The style of building that would be suitable in sunny Spain would be utterly unsuitable in the foggy climate of England, and, therefore, owing to the immense territory throughout which this style developed, a considerable variation of detail is found, due to climatic conditions.

42. Religious.—Were it not for the civilizing and educating influence of the Church, Romanesque architecture

would not have possessed the unity of feeling necessary for the establishment of one style throughout Europe. The differences in climate, materials, and geographical positions would naturally have produced a variety of styles if there had not pervaded throughout the entire country one general religious motive that prescribed certain details of manners and customs uniform throughout the Christian world. The erection of a church was often the foundation of a city. Monasteries grew to great power until they practically controlled the local civil governments. Science, literature, art, and general intellectuality were not considered to be of any importance to any except the religious orders until after the middle of the 12th century. Students in the monasteries became designers of great cathedrals, and the relation of the monastic institutions to architecture was consequently of great importance. In fact, architecture was practiced almost entirely by the clergy, and was regarded as a sacred science. The monastic orders thus founded and fostered many arts, the products of which are associated with the names of those orders at the present day. The Dominican order was founded in the South of Italy by Saint Benedict, and in its monasteries throughout Europe were taught architecture, painting, mosaic, and all branches of art work. This order of monks controlled all the old monasteries in England, such as Canterbury, Fig. 69, and Westminster Abbey, Fig. 73.

43. The Romans, when they wished to erect great monuments of public utility, could send to the spot, no matter how remote, an army of soldiers, and by their tyrannical system of government compel the inhabitants of the locality to desist from all other employments and work for the emperor of Rome. Thus by a multitude of hands they achieved those prodigious results that today stand monuments to their enterprise and their despotism.

Had the builders of the middle ages desired to pursue this course, they could not have found the army of workmen. In a country without stone, without money to buy it, without beasts of burden to transport it if they could buy it, even

without roads over which to travel, these people could not possibly attempt to follow the course of their Roman neighbors.

For the following reasons, therefore, the religious orders were the first that could by themselves undertake important building:

1. Because they could gather together at one place a number of men (monks) united by a single paramount thought, subject to discipline, freed from military service, and possessors, in the name of the Church, of the land on which they lived.

2. Because the religious orders acquired property and improved it under a regular administration; because they joined in amicable intercourse with neighboring establishments; because they plowed the uncultivated lands, laid out roads, and with the fruits and tolls of their industries bought quarries and woodlands, built workshops, and offered to the peasants guarantees that could be depended on. Thus the church lands were rapidly populated and improved, while those of the laity and nobility were continually devastated by war.

3. Because the religious orders were able to form—with their monasteries, schools of craftsmen, subject to regular apprenticeship, clothed, fed, maintained, and worked under the same directing influence—schools that preserved traditions and recorded improvements.

4. Because the churchmen alone, at that time, extended an influence to a distance by founding remote establishments subject to the mother abbey.

Hence, to the activity of religious orders the art of construction owes its rise from barbarism in the 11th century.

44. Political and Historical.—About the year 800 A. D., the Roman Empire in Western Europe passed entirely from the hands of the descendants of the original Romans by the election of Charlemagne, a Frankish king, as emperor. Charlemagne encouraged the establishment of the monastic communities and thus encouraged building. He restored the

arts, improved civilization, and did much for the general progress of Western Europe.

However, a popular superstition did much to retard the progress of this period. It was generally accepted as a fact that the end of the world would come in the year 1000, and few buildings were erected as the task seemed to be useless. When the dreaded year arrived and passed, however, the superstition was broken, and building activity sprang up everywhere. All the great nations of Europe had by this time come into existence. France, Germany, and Spain were becoming individually powerful. Denmark, Sweden, Norway, and England were distinct kingdoms, and, under individual influences, were developing individual styles. Civilization progressed rapidly and independently in each local section.

45. Feudalism.—Before studying the development of medieval architecture it will be necessary to consider the peculiar system of government that existed throughout Europe during the middle ages. This system was called **feudalism,** and developed from the peculiar relation that existed in the Teutonic tribes between the men and their chiefs. When these tribes overthrew the Roman Empire, 476 A. D., every free Teuton that had served his chief in the conquest received as his share of the spoils a tract of land that became his personal property, or *freehold.* The chief, of course, retained a very large domain for himself and it became customary for him to grant portions of this domain to certain of his favorites and followers on condition that they would serve him in time of war. These grants of land were different from the freeholds, and were called *fiefs.* The person that received them did not own the land, but held it by *feudal tenure* so long as the conditions imposed on him by his chief were fulfilled. The chief, or king, could recall the land at any time he wanted and give it to another if he chose. The person holding the land under feudal tenure was called a *vassal.*

Just as chiefs or kings made feudal grants to their favorites, so some of the smaller Teutonic landowners granted portions

of their land and retained vassals of their own. Bishops and abbots granted extensive tracts to various knights, who thus became vassals of the Church. By the 11th century, all Europe was governed by a system of feudal tenure, and very little land was held in freehold. The great nobles that originally inherited freeholds were glad to return them to the king and receive them back as fiefs, thereby becoming vassals of the king and receiving from him many rich gifts that were in his power to bestow. Thus, all property became a connected system of fiefs, and, from the king down to the poorest freeman, land was held in feudal tenure, and every individual was a vassal to some one a little higher up. Kings themselves became vassals of other kings in the cases of the lands lying beyond the boundaries of their kingdoms. Thus, William the Conqueror, when he became king of England, was, as duke of Normandy, a vassal of the king of France.

46. So far only landholders have been considered, and these were the forefathers of subsequent nobles; the great mass of the people, however, were not freeholders at all, but *serfs*. Serfs were not slaves—they could not be bought and sold—but they were bound to the land and belonged to it, so that when it changed hands from one owner to another, they were bound to change with it. Each fief consisted of two distinct details: the castle, usually located on a hill, where the proprietor, or noble, lived with his family and his soldiers, and the village, or *cité*, which was inhabited by the tillers of the soil. Many of these were free-born men that rented land or served for wages, while others were serfs that were the born servants of the owner of the soil.

Feudalism tended to prevent the growth of the nations. A kingdom consisted of a cluster of principalities under a common head—the king or emperor—but that head lacked power, as no one of the nobles, should he choose to disobey the king, could be forced to fulfil his feudal duties except by means of war. Consequently, the kings were at war with one or more of their vassals nearly all the time.

47. Chivalry.—One important product of feudalism was **chivalry,** which grew into a tremendous establishment and for several centuries exercised a marked influence on the habits, manners, thoughts, and sentiments of men of all nations in Western Europe. Chivalry was at the zenith of its influence at the time of the crusades, which will be discussed later, and it ceased to exist when feudal society became extinct. Chivalry had its origin in two characteristic instincts of the Gothic races: first, the great honor paid to the profession of arms, and, second, the delicate gallantry of the Teutons to the female sex.

In the 11th century, it was customary for all sons of the various vassals of a lord to attend a court, or school, in his castle, where, with the members of the lord's own family, they were trained in military exercises and feudal etiquette. Boys from 7 to 14 years of age were termed *pages*, and the duties of these pages were to attend the ladies of the mansion in their walks, rides, and hunting trips. The page was taught obedience and courtesy, and was instructed in music, chess, religion, and the use of light weapons. Being thus constantly surrounded by noble knights and ladies, the boy's earliest impressions were of gallantry, honor, and bravery. At the age of 14 the boy became a *squire*, whose duty it was to serve some knight and learn the profession of arms under his tuition, to look after the arraying of his master's armor, and to attend him in time of war. At the age of 21, after an imposing ceremony, during which he took a vow to champion the Church and the clergy, and to be a protector of ladies and a redresser of the wrongs of widows and orphans, the squire became a *knight*. The attainment of knighthood was the ambition of every youth, and to this end his entire education was arranged. Reading and writing were useless accomplishments at this period.

Chivalry had much to do with establishing the customs and habits of the people until the decline of feudalism, and its influence extends even to the present day. From the knight of the middle ages developed the gentleman of today. In antiquity men were trained to be heroes; the term *gentleman* was unknown.

48. The Dark Ages.—During a part of this feudal period, it is strange to note, civilization declined almost to barbarism. Up to the fall of the Roman Empire, the Romans enjoyed a high state of civilization and culture, and great libraries of books existed in Rome and Alexandria. These books were written in Latin, which was the language of the Roman Empire at that time, but for the succeeding three centuries the barbarous Teutons that had conquered Rome refused to take on themselves any culture, and learned only sufficient Latin to enable them to govern and trade in their Roman possessions. The Latin spoken by the Teutonic invader was a sort of broken Latin, which was called *Roman*, while the classic Latin was still written by the scholars, most of whom were the clergy. Different parts of the country produced different dialects of this Roman language, and so there gradually developed the Italian, French, and Spanish languages. Latin had ceased to be a living language, and the treasure of knowledge in Latin books was apparently forever locked up from the people. Those who might have had a desire to study were left destitute, as all books were in classic Latin, which could not be understood by them, while in the Roman language, which they did understand, no books were written. There being no books, there was no necessity of being able to read or write, and it was rare for any one but a churchman to be able to sign his name. Latin was still taught in the monasteries and was reserved for religious education, but the people in general had no opportunities to learn it. Even the Latin books became scarce, thus involving even the clergy to a certain extent in the general ignorance.

Only two kinds of writing material were then known: parchment, and paper made from the papyrus plant. After the Saracens invaded and conquered Northern Africa, papyrus was unobtainable, and new parchment was too costly to be spared for book purposes. This caused the monks to erase many old manuscripts from the parchments and to write new ones on the same pages. In this way, many of the works of ancient authors were lost in order to supply

material on which a religious sentiment or the legend of a saint might be written. The few sparks of ancient learning that survived during these centuries were preserved only through the Church. The monks were taught to read and write, and they spent much of their time in illuminating missals and executing wonderful work with the stylus and brush, so that through the monasteries a slight knowledge of the conditions of this period has been preserved to the present day. That this barbarism and inactivity was due to the lack of books will be evinced later on, and with the invention of printing came the awakening, advancement, and real progress of the world.

The illuminated manuscripts of the Middle Ages are wonderful works of art and skill. They are mostly written in Latin; the body of the text being executed letter by letter with the stylus, and the initials, borders, chapter headings, etc. rendered in gold and color with the stylus and brush, Fig. 16 (*a*). Many of these manuscripts were the work of a lifetime in the monasteries, and no amount of trouble seemed excessive to the devoted monks that had consecrated their life's work to the propagation of their religion.

Illumination did not originate in the monasteries, however, as the art was derived from Greece, and was never lost in Europe until after the invention of printing. None of the early Greek and Roman manuscripts have been preserved, but there are many designs in the Byzantine manuscripts that are evidently copied after them.

Illumination was also practiced by the Arabs, Persians, and other Oriental nations, and many beautiful pages from the Koran exist, that were executed from the 14th to the 18th century.

CHARACTERISTICS

49. The term *Romanesque* can be said to apply to all architectural constructions in Western Europe that were based on Roman art and theory, and carried out in a rough and primitive way according to the means and material of each individual community. In general character, Romanesque architecture is simple, sober, and dignified; but it is picturesque through the introduction and grouping of towers and the projection of various wings and transepts. A new constructive principle now appears—the principle of equilibrium, or balance, in contrast to the principle of stability, as practiced by the Romans. Where the Roman architect had to withstand the thrust of an arch, he planted an immense quantity of masonry strong enough to withstand it by dead weight; whereas, if a Romanesque architect wished to withstand the thrust of an arch, he arranged for it to receive the thrust of another arch in an opposite direction, thus counteracting the force.

A new material also was now used—dressed, or cut, stone laid together in the body of the wall with beds of mortar. Heretofore, walls had been of concrete and were only veneered, or surfaced, with stone, but now stone was built in as part of the wall, and by this new employment of the material, architecture became a system of construction, and development of this construction henceforth marked the development of a new architectural style. Here, too, is found the column used as a direct support of the building. In Roman architecture, the columns were applied on the faces of concrete piers or supported only an entablature over a porch. The Romanesque architect, however, used columns to support the arches, taking up the thrusts by counterthrusts from other arches.

50. The principle of balanced thrusts is illustrated in Fig. 17. In (*a*) is shown a section through the roof and two side walls of a building. The weight of the roofing material presses downwards on the rafters in the direction

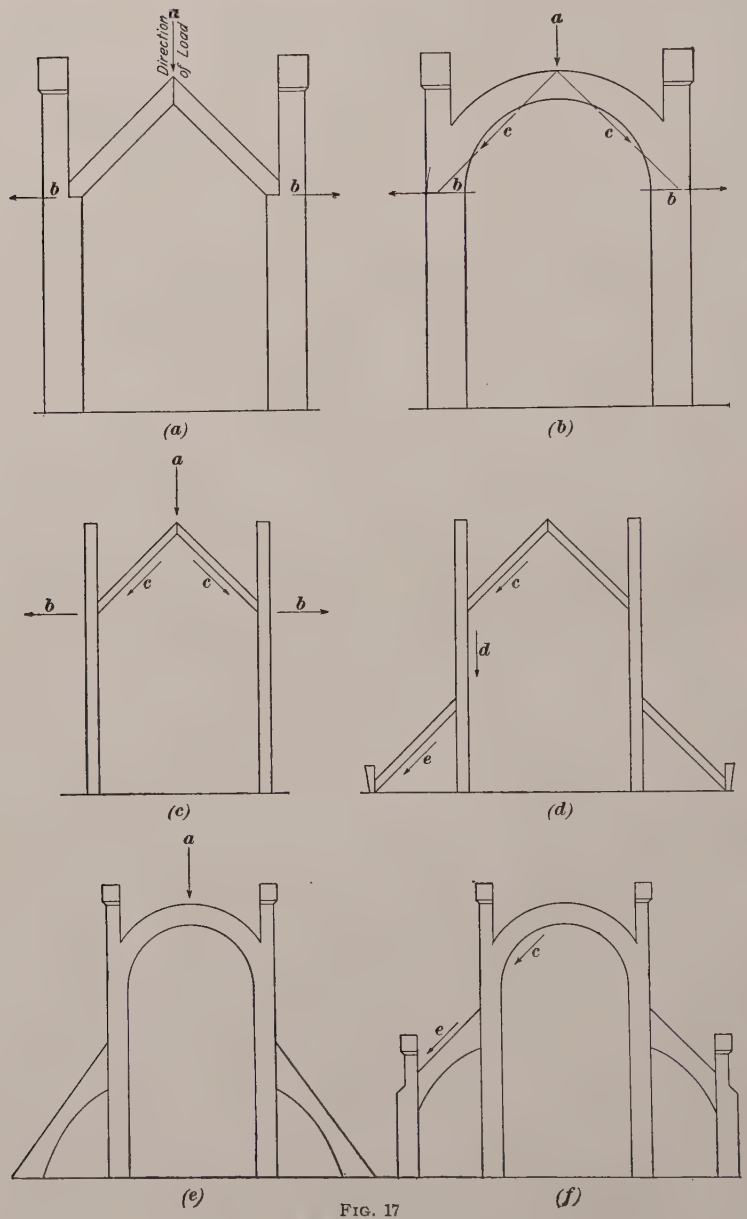


FIG. 17

of the arrow *a*. This pressure tends to depress the rafters and to overturn the side walls in the direction *b*. If, instead of rafters, a masonry arch is turned between the walls as in (*b*), the effect will be the same. The load in the direction *a* will be split and transmitted against the walls in the direction *c*, and unless they are strong and heavy enough to withstand this thrust, they will turn over in the direction *b*. Two upright timbers supporting two rafters, as in (*c*), would immediately fall outwards if a load were imposed at *a*; but this could be obviated by placing props against these timbers and driving stakes into the ground at the foot of the props, as in (*d*). The thrust would then take the direction *cde*. Now, applying this principle to the condition existing in the stone arch in (*b*), there will result a structure similar to that shown in (*e*), where half arches on each side prop up the main walls under the arch. The development of this principle as completed in (*f*) presents the complete principle of buttresses and flying buttresses in medieval architecture. The *flying buttresses* are the semiarches that prop up the main arch, and the *simple buttresses*, like stakes in the ground, carry the load to the earth. This principle is illustrated in the cathedrals shown in Figs. 66 and 67.

51. Romanesque architecture was distinctively ecclesiastical. Civilization and culture emanated from the Church, and the requirements and discipline of the religious orders gave form to the builders' art. The basilican style of building, which had so well served the purposes of the Church in the earlier centuries, suited the new conditions only so far as its plan was concerned. Corinthian columns, marble incrustations, and splendid mosaics were not to be obtained in the forest lands of Northern and Western Europe, and the priests and monks endeavored to erect, with unskilled labor, churches of stone and as far as possible of a fireproof construction in which the general arrangement of the basilica plan should be maintained. The struggle with this problem underlies the entire system of

Romanesque design, while the solution of the problem characterizes the development of the Gothic style.

52. However rich and powerful the monks might be, compared with the feudal lords and barons, they could not hope to build as the Romans did. They endeavored to erect solid and durable structures, but practiced the closest economy, owing to the scarcity of materials and men.

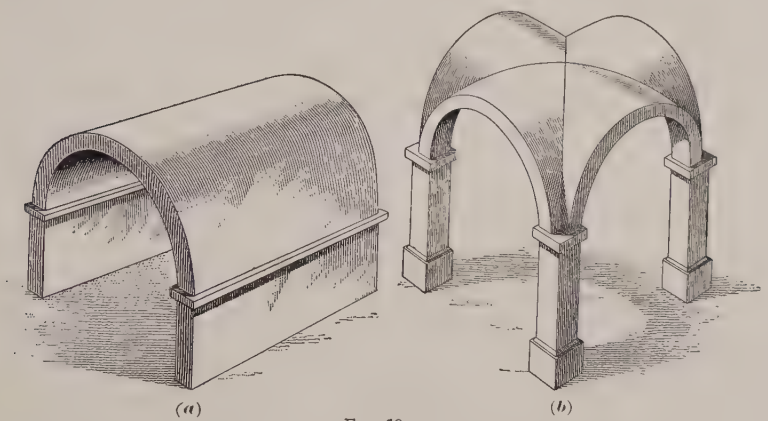
To follow the Roman method of making their structures a mass of rubble between two faces of ashlar or brick, demanded more laborers than they had at their disposal. To build of enormous blocks of hewn stone, carefully cut and set, as the Greeks did, required means of transportation far beyond their facilities. So they pursued a middle course. For the principal points of support, they used cut stone as a casing and filled in with rubble, and for other walls, a thin facing of ashlar enclosing a concrete filling made of pebbles and mortar.

The Roman buildings, by reason of the absolute stability of the different points of support and the perfect concretion, or solidifying, of all the upper parts, presented immovable masses, as if they had been cut out of a single block. The Romanesque builders soon realized that their buildings presented no such stable conditions. The piers, which were formed only with a veneering of solid stone and put together with a poor quality of mortar, and the walls, which were unbonded throughout their height, suffered from unequal settlement, causing ruptures, and, consequently, serious accidents. These errors were not repeated, however, and the endeavor to avoid them resulted in a new development.

53. Romanesque Vaulting.—In order to comprehend the development of architecture from this period to the end of the Gothic period, the system and development of vaulting should be clearly understood.

Toward the beginning of the 11th century the Romanesque architects attempted to *vault* their structures. They had inherited a knowledge of the value of the Roman vault, but were unable to use it owing to the lack of sufficiently

powerful walls in the structures they had built. The Roman vault will sustain itself only when its supports are solid and immovable; for it is formed of a homogeneous crust of concrete, which, lacking elasticity, breaks to pieces if small crevices appear in its curve. Unable to furnish sufficiently stable walls to support vaults as the Romans did, the medieval builders invented new methods of holding them firmly. The earliest of these attempts ended in failure, but from the very beginning, a new system of building is apparent, founded on the principle of *elasticity*, in contrast to the principle of *stability*, or rigidity, practiced by the Romans. The typical Roman vault, Fig. 18 (*a*), is built of rough-stone concrete, and though sometimes strengthened by



(*a*) (*b*)

FIG. 18

arches of brick, these arches are buried in the concrete and thereby become a part of the homogeneous mass. In contrast to this method, the Romanesque builders constructed their vaults of hewn stone laid in mortar, following the form of the Roman cradle vault shown at (*a*).

54. The medieval craftsmen at this time knew nothing of the laws of statics, and the thrust exercised by the arch on the side walls being something entirely new to them, they neglected to provide sufficient means to withstand it. Consequently, at the end of the 11th century, many churches

and halls that had been built and vaulted for a period of only 50 years fell in ruins from the collapse of their walls, due to the thrust of their vaults. These accidents, though unfortunate, bore good fruit; they were a lesson to the builders, and showed that other means had to be provided to accomplish the desired end. These same builders knew that a groined vault, such as is shown in Fig. 18 (*b*), exercised its pressure and thrust only at the four supports, and, recognizing the advantage of the groined vault, they tried to replace the cradle vault with it and thereby bring all the weight on piers, which they hoped to be able to render stable. But new difficulties immediately arose. The Roman groined vault can be built only over a square space, and it was necessary to invent a combination of groined vaults adapted to an oblong space.

55. The building of a Roman groined vault requires four semicircular centers, or templets, one for each end of the intersecting vaults, and also two diagonal centers, the curve of which is not a semicircle, like the other four, but an ellipse, as shown in Fig. 19, in which the two front ends of the vaults are removed to show the line of intersection, or *groin*, and the elliptical profile for the center *e o e*.

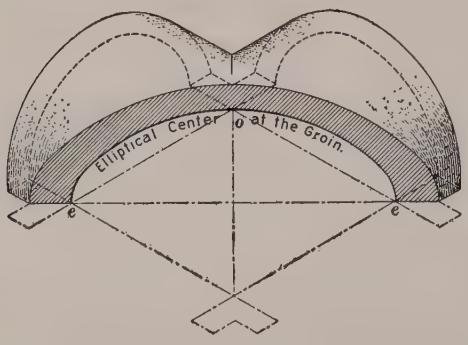


FIG. 19

The Romanesque builders did not comprehend the curve of the ellipse, and, having described a semicircle in order to cut out timber centers of the four arches generating the vault, they described a second semicircle on the diagonal as a diameter in order to cut out the two diagonal centers. Thus, the crown *o*, Fig. 20, where these two vaults intersected, was on a higher level than the crowns *a* and *b* in the

generating arches, and the vault, instead of being the result of the intersection of two semicylinders, was a nameless compound of curved surfaces, slightly resembling a dome.

On this principle is based the whole system of vaulting during the middle ages. This principle is important on account of the fact that, though they were trying to use the Roman vault, they modified it to such an extent that it became a different device entirely, and the builders of the middle ages were thus suddenly emancipated from all the bad influences of the Roman style, and left free to develop a new style from the raw material they had at hand, in the same manner that the Byzantine builders developed an original style, by careful study of the structural principles of the dome.

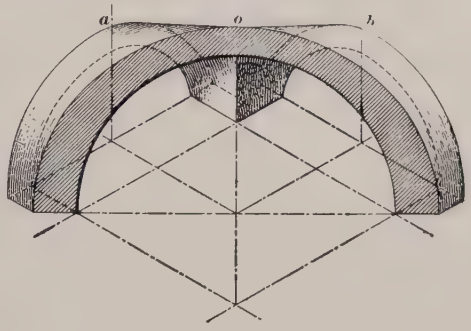


FIG. 20

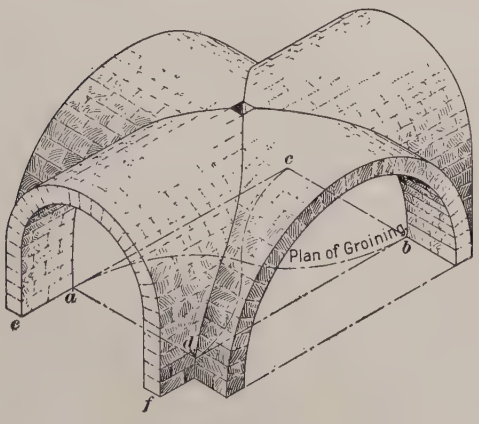


FIG. 21

56. Having modified the Roman vault in this way, the next problem was to apply it to oblong plans, for the builders had already realized the danger of applying cradle vaults to wide spans. The Roman groined vault, applied to oblong spans with a wide intersection, required the arch over the narrow span to be *stilted*, as shown at *e f*, Fig. 21, and the lines of the groins *a b*

and *c d* were not straight, but formed the compound curves *a b* and *c d*. This was a still more complicated problem for the Romanesque builders, but they solved it in the same manner as before, by cutting the centers, both for the ends and for the intersections of their vaults, in the form of a semicircle. But with this simple solution another difficulty arose. The lines of intersection, or groins, in the Romanesque vault were forced by circumstances to be straight in plan, as they were built over semicircular centers; but this produced such a warped surface in the vault covering itself that the groins were *projecting* at the springing point and *indented* at the crown.

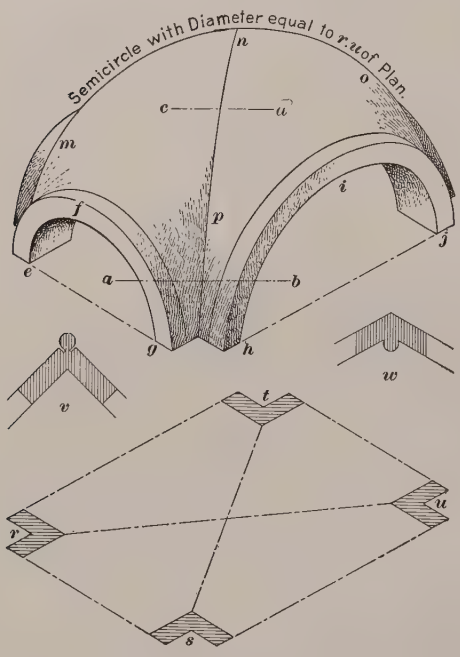


FIG. 22

Fig. 22 shows an exaggerated form of the Romanesque groined vault with the arch *e f g* over the end *r s* of the oblong space *r s u t*, and the arch *h i j* over the side *s u*. The intersecting curves *m n o* and *p n* over the diagonals *r u* and *s t* are semicircles, but the groins inside the vault do not produce a continuous angle on which a bead can be worked, as is the case when the arches are two intersecting cylinders of the same diameter. A section through the corner on the line *a b*, would produce an exterior angle, as shown at *v*, with the bead worked on the corner, but in following the groin up into the vault, the angle becomes more and more obtuse until it reverses itself and at *c d* becomes an interior

angle, as shown at *w*. This was very unsightly, and the builders immediately set to work to improve on it.

57. It was at this time that the pointed arch made its appearance, and there is little doubt that its invention or adoption was the direct outcome of the difficulties in groined work just cited.

In Fig. 23 is shown a pointed groined vault with the groins built on semicircular centers *c d e* that are higher at their middle points *o* than the crowns of the pointed arches *a* and *b*. The crown of the vault is therefore curved in the same manner, though not so much as the crown of the vault shown in Fig. 21; but the groins in the pointed vault are perfectly straight throughout their length and can be worked or beaded as desired. As said before, the method of building these arches was not that of the Romans—a solid concrete mass with brick arches embedded in the concrete to give it strength while it was setting—but, on the contrary, the late Romanesque vault was composed of small panels, or slabs, laid on the ribs, or groins, for support. At each end of the vault a pointed arch was formed, and at the intersection, or groin, a semicircular arch was turned, as shown in Fig. 23; on these arches boards were laid, and the masonwork of the vault was then built over the boards, the arches remaining in place and thereby forming a sort of permanent center.

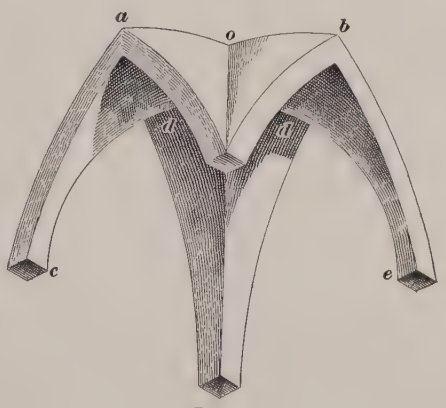


FIG. 23

58. Fig. 24 illustrates the constructive system of the late Romanesque or early Gothic church, the transition from one style to the other being so gradual that an exact line of

distinction cannot be drawn. The walls *a* of the nave are supported on the columns *b*, and the roof over the nave is vaulted in the Gothic system just explained. The groins, or ribs, of these nave vaults rest on the piers *c*, which are directly over the columns *b*, and the thrust of the nave vaults is carried by the flying buttresses *d* across the aisle vaults *e* to the solid buttresses *f*, the lower portion of which also receives the thrusts from the aisle vaults at *g*, thus illustra-

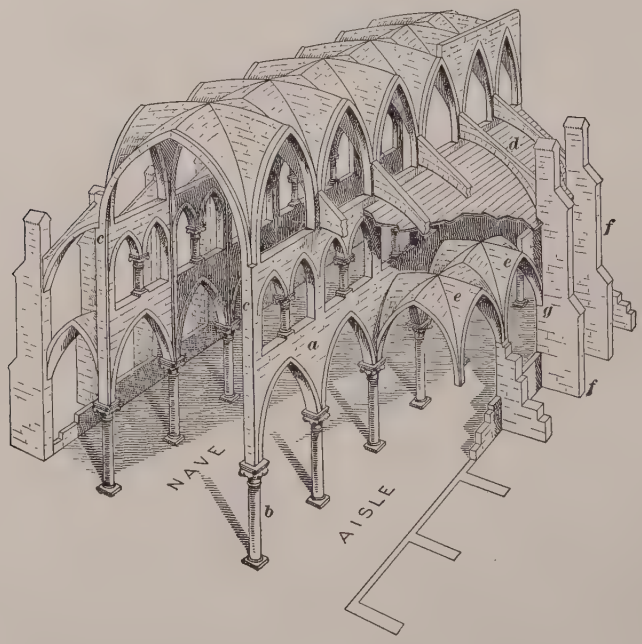


FIG. 24

ting the two great principles of Gothic construction: concentration of load on isolated supports, and balanced thrusts. The former of these principles was made possible by the use of the groined vault instead of the barrel vault, as the former required supports only where the groins rested and the structural details of the church became simply a stone roof, supported on masonry stilts and filled in between with thin screen walls, as shown in Fig. 24.

59. The second of these Gothic principles of construction is in direct opposition to the Roman system of vaulting, where the thrust of the vault was resisted entirely by the inertia of a mass of masonry piled against it in the abutments. In late Romanesque and Gothic architecture the thrusts of one vault were counteracted or balanced by the thrusts of adjacent vaults and the accumulated strains then transmitted by means of *props*, or flying buttresses, to heavy fixed buttresses located at convenient points. This system of construction reached its greatest development in French cathedrals during the XIII and XIV centuries.

ANALYTICAL STUDY

PLANS

60. Charlemagne adopted the plan of the Roman basilica as a model for his new churches, and, with the assistance of artists and skilled workmen to carry out his ideas, erected them in the Roman style. Transepts were added to the basilica until the church become crucial in form, and a chancel for the clergy was screened off and prolonged on the east end. Generally speaking, the transepts were the same width as the nave, and the nave was twice the width of the aisles. The choir was raised on a series of steps, under which was usually established a crypt, to receive the dead bodies of prominent persons. Many of the older churches had cloisters in connection with them. These consisted of a vaulted passageway extending around a court or leading from the chapter house to the church. The cloisters were designed with great care and possessed decorative details of great beauty. The introduction of the tower, or spire, where the transept crossed the nave, added greatly to the beauty of some of these structures, and gave importance to this part of the plan which was termed the *crossing*. Although many adjuncts were introduced into the Romanesque plans, they still retained in the majority of examples the fundamental arrangement of the Roman basilican.

WALLS

61. While the Roman system influenced all construction work in Europe, it had materially declined in character before the fall of the Empire, and technical skill being particularly scarce during the early Romanesque period, the masonry was carried out with extreme crudeness.

ROOFS

62. In the 11th century, vaulting was introduced over the side aisles for the purpose of fireproofing. But the nave was still covered with a roof of wood. The earliest examples of vaulting appear as plain intersecting barrel vaults without any rib moldings, as in Fig. 18 (*b*), but simple ribs were introduced about 1100 A. D., and afterward molded ribs appeared.

Thus the Roman style of vaulting existed throughout Europe until the beginning of the 12th century, when a framework of groined ribs was used to support vaulted surfaces of thinner stone, usually termed *in-filling*. By the latter method the vault was designed according to the profile of the rib, instead of designing the rib to conform to the profile line of the intersection of the vaults. In the Romanesque method, the vault surfaces were governed entirely by the form of the rib set for their intersections, whereas in the Roman method the form of the vault surfaces was determined first and the groins were left to come out in their own geometrical form. The Romanesque architects worked out problems the fixed data for which were the profiles of the intersecting ribs; the Roman architects let these ribs take care of themselves.

The inability of the Romanesque architect to lay out an ellipse of the proper height and span lead to various systems in different parts of the country. In Germany and France, vaulting ribs were usually portions of circular curves, which gave the intersecting vaults a domical aspect. In England, the ridges of the vaults were maintained on the

same level, and a difference in height between the diagonal rib as a semicircle and that of the profile of the intersecting vaults was taken by *stilting* the latter. In cases where a large compartment and a small one intersected, the line of intersection of the two vaults presented a very unsatisfactory and wavy contour. In some Romanesque churches, as at Worms in Germany, Notre Dame at Paris, and Canterbury in England, the difficulty of spanning oblong compartments was overcome by uniting two under one vault. In this manner each pair of side compartments was made to correspond in width with the main compartment in which they were vaulted, as shown in Fig. 54 (*b*), where the main bays are formed to include two smaller bays at the end of the aisle including the windows. In other cases, the intermediate support was carried up and split into three ribs, thus dividing the vaulting into six triangles in the plan, as shown in Fig. 56 (*c*), where *a b* and *c d* are the ribs of the main vault and *e f* is the transverse rib between the aisle vaults. The plan therefore shows six triangles with *a e*, *e c*, *c b*, etc. as their bases, and their vertices at the point where *a b* and *c d* intersect. Such vaulting was known as *sexpartite vaulting*, and the weight of the vaults was supported on alternate piers.

From this time forward, the principle of rib design dominates the style of the vault, and becomes more and more complex, characterizing the several periods of the Gothic style. It will be observed hereafter that the difficulty of accommodating different heights of arches in the intersections of diagonal ribs was entirely overcome by the introduction of the pointed arch.

COLUMNS

63. Flutings, both vertical and spiral, and naturalistic carvings on the shaft are characteristic of the Romanesque period. At first there was undoubtedly a strong influence exerted by the Ionic and Corinthian capitals, but the characteristic Romanesque style developed itself later.

OPENINGS

64. One of the strongest characteristics of the Romanesque style is found in the door and window openings. The jamb around the door was formed in receding planes, or *orders*, as they were termed, in each of which was inserted a small circular column. The arch over these columns was built in concentric circles [see Fig. 49 (*c*)]. Circular windows over the principal doorways were also common at this time and the principal doorway generally entered one of the transepts.

MOLDINGS

65. Generally speaking, Romanesque moldings consisted of the ornamentation of the projecting stone courses, with chamfers, rounds, and rough-carved ornamentation. At first these were hewn out with the stone ax, but afterwards they were more finely cut with the chisel. On bases of columns, a form of the old classic base was used over a square plinth, with carved leaves to fill up the projecting triangles at the corners, or with the lower torus molding overhanging the plinth.

ORNAMENT

66. All decorative design was derived from vegetable and animal elements, and was very rudely carved and very conventionally treated. Fresco is more frequently found on the walls than mosaic, owing to the lack of skilful artists, and the designs in stained-glass windows show the influence of the Byzantine character.

These are the general characteristics of Romanesque architecture throughout Europe. Individual characteristics will be discussed under the separate countries.

Romanesque architecture does not present that brilliancy of decorative effect that characterizes the Byzantine. As has been explained heretofore, marble columns and elaborate mosaics were unattainable by the Romanesque workers, while the wealth of Byzantium rendered such luxuries a

characteristic of the Byzantine style. The Romanesque builder therefore decorated his walls with carving and fresco work which he could execute himself, while the Byzantine imported talent from Italy, Greece, and the Orient.

REVIEW EXERCISES

1. When and in what countries did Romanesque architecture flourish?

2. In what way did religion affect the architecture of the Romanesque period?

3. In what way did the Romanesque system of building differ from the Roman system?

4. Why was there but little building before the 11th century?

5. (*a*) What system of government existed throughout Europe during the Middle Ages? (*b*) Describe it briefly.

6. Of what did chivalry consist?

7. What were the Dark Ages?

8. To what does the term Romanesque architecture apply?

9. What is the essential difference between the Roman system and the Romanesque system of vaulting?

10. Give the general characteristics of Romanesque: (*a*) plans, (*b*) openings, (*c*) roofs.

ITALIAN ROMANESQUE

INFLUENCES

67. Geographical.—In Italy there were different influences at work that materially affected the architecture in different sections. The central portion, as shown on the map, Fig. 25, including Rome, extends from Florence and Pisa on the north to Naples on the south. Pisa and Naples were maritime cities and commanded a large Mediterranean trade, while Florence was inland, on the road to the north, and commanded the passage of the Arno River. This central section being nearest Rome, its architecture was greatly influenced by the classic monuments.

Northern Italy, extending from Florence to the Alps and Tyrolean Mountains, contained the city of Milan, which always enjoyed a prosperous trade owing to its proximity to the Alpine passes and its position in the center of the state of Lombardy, of which it was the capital. On the east coast are the cities of Ravenna and Venice, both of which had extensive trade with Byzantium, as has heretofore been pointed out. The Romanesque of Northern Italy was therefore influenced by the architecture of both Northern Europe and the Orient.

Southern Italy, including Sicily, being situated practically in the center of the Mediterranean Sea, had for years been under the influence of both Northern Africa and Greece. Sicily had belonged to each of these countries before it became a part of Italy. The architecture of Southern Italy therefore shows the influence of these foreign countries.

68. Geological.—Building materials abounded in great variety in Central Italy. Near Rome, brick, volcanic stones, and travertin were used, the latter being imported from

Tivoli. Marble was imported from Pharos, Carrara, and other Greek islands. In Northern Italy, brick was the principal building material obtainable. In Southern Italy, the mountains afforded an abundance of limestone.

Fig. 25

69. Climatic.—In Central Italy, the climate is warm and agreeable, but in Northern Italy it varies from extreme cold to excessive heat, similar to the climate of Central Europe. Milan is near enough to the mountains to experience very cold winters, while its summers are almost tropical. Southern Italy enjoys a tropical climate. Palm,

lemon, and orange groves flourish the year round, and on the southern coast the climate renders many Oriental customs characteristic.

70. Religious, Political, and Historical.—In Italy are found the first great influences of the Church in the administration of the government. The popes at Rome had thus far only small, landed estates of their own, but their relations with the kings of the newly established countries gave rise to numerous disputes. Therefore, the history of the papacy is closely interwoven with the development of civilization from this time on. Until the overthrow of the Western Empire, this part of the world was practically in a chaotic condition. The Church alone was able to preserve organization of society, and therefore became a great moral power.

By the middle of the 8th century, the Lombards had established a powerful kingdom in Northern Italy and began to encroach on the possessions of Rome in Central Italy. Pope Stephen II then asked Pepin, who was king of the Franks (a Christianized Gothic nation that inhabited nearly all the country now known as France and Germany), to help defend Rome against the Lombards. Pepin responded to the pope's request by defeating the Lombards, winning from them the territory of Ravenna and other lands, which he immediately turned over to the pope. Stephen II accepted this in the name of St. Peter, and thus was established the temporal power of the Church.

71. On the death of Pepin, his empire was inherited by his son Charles, one of the greatest men of the middle ages, and known in history as Charlemagne, a French combination meaning Charles the Great. Charlemagne invaded Italy in 773 A. D. and the Lombards were again defeated. He then united Lombardy to the kingdom of the Franks and confirmed the gifts of his father, Pepin, to the pope. At the end of the 8th century, Charlemagne entered Rome and was crowned emperor of the West by the pope. Charlemagne fell heir to the kingdom of the Franks, and at the age of 60 he was

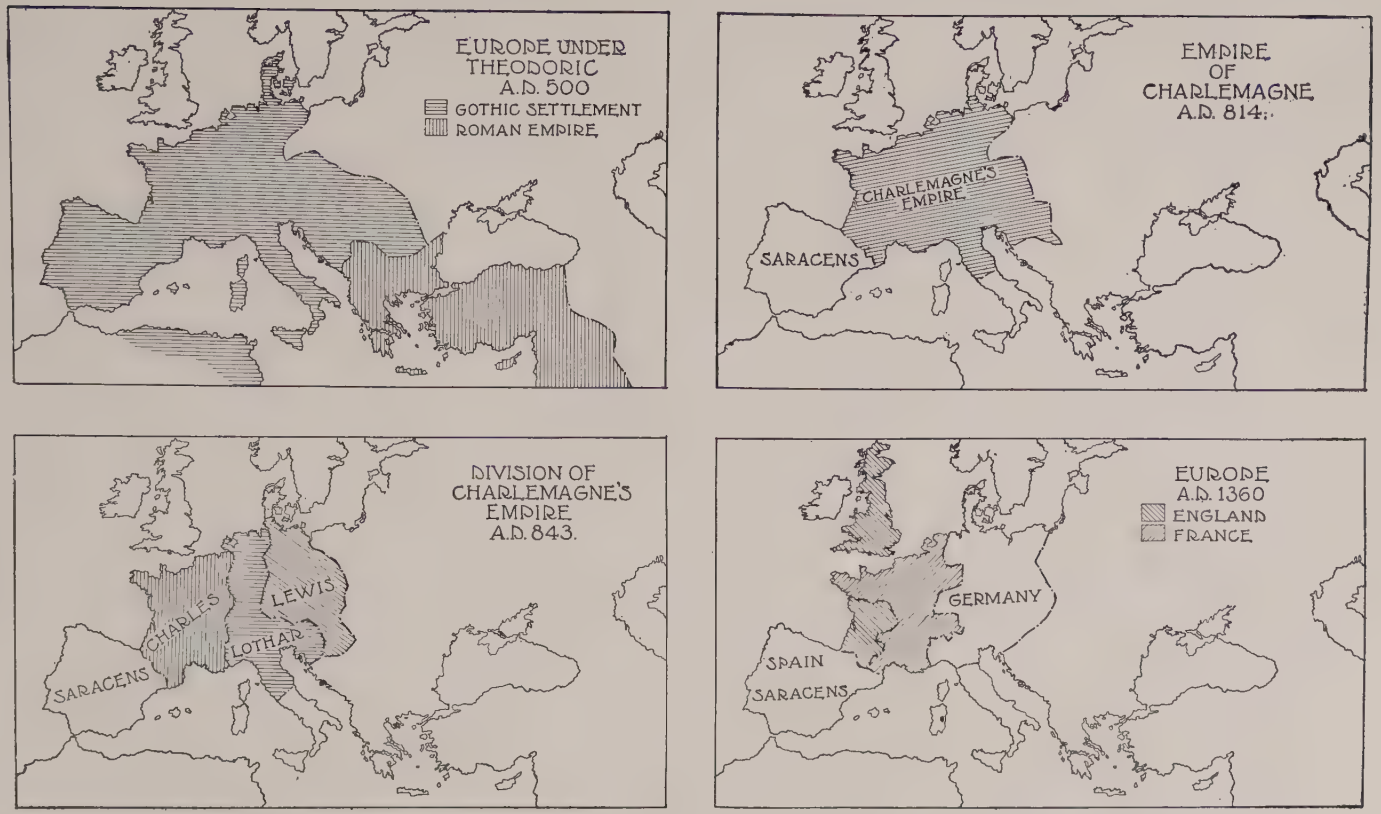

EUROPE UNDER THEODORIC A.D. 500
GOTHIC SETTLEMENT
ROMAN EMPIRE
EMPIRE OF CHARLEMAGNE A.D. 814.
CHARLEMAGNE'S EMPIRE
SARACENS
DIVISION OF CHARLEMAGNE'S EMPIRE A.D. 843.
CHARLES
LEWIS
LOTHAR
SARACENS
EUROPE A.D. 1360
ENGLAND
FRANCE
GERMANY
SPAIN
SARACENS

FIG. 26

monarch of an empire practically as large as that of ancient Rome (see Fig. 26).

Charlemagne was succeeded by his son Louis, a weak monarch, under whom the empire rapidly fell apart. Disputes arose, and Louis turned the reins of government over to his three sons, Lewis, Lothar, and Charles. These rulers quarreled among themselves, until finally, in 843 A. D., the empire was divided among them, and the history of France, Germany, and Italy as separate states began (see Fig. 26).

During all this confusion, the pope at Rome endeavored to exercise his authority in political matters, and thus instituted a struggle between the kings and the popes that lasted many bitter years.

In the meantime, Southern Italy had come under the influence of the Saracens, who had landed in Sicily in 827 A. D. and gradually overran the whole island. For a century, the Saracens held full power, but they finally quarreled among themselves and lost the island to France.

CENTRAL ITALIAN ROMANESQUE

CHARACTERISTICS

72. In Central Italy, the general type of the basilica was maintained, owing to the proximity of Roman models. New ideas of any form were few, and no tendency toward a new style seemed apparent.

EXAMPLES

73. Cathedral at Pisa.—The cathedral at Pisa, Fig. 27, is a characteristic building of this period. Small, external, superimposed arcades produce a fine effect, as does also the treatment of the walls with blind, or false, arcades, in red and white marble. The interior columns support a flat ceiling, suggesting the basilican church.

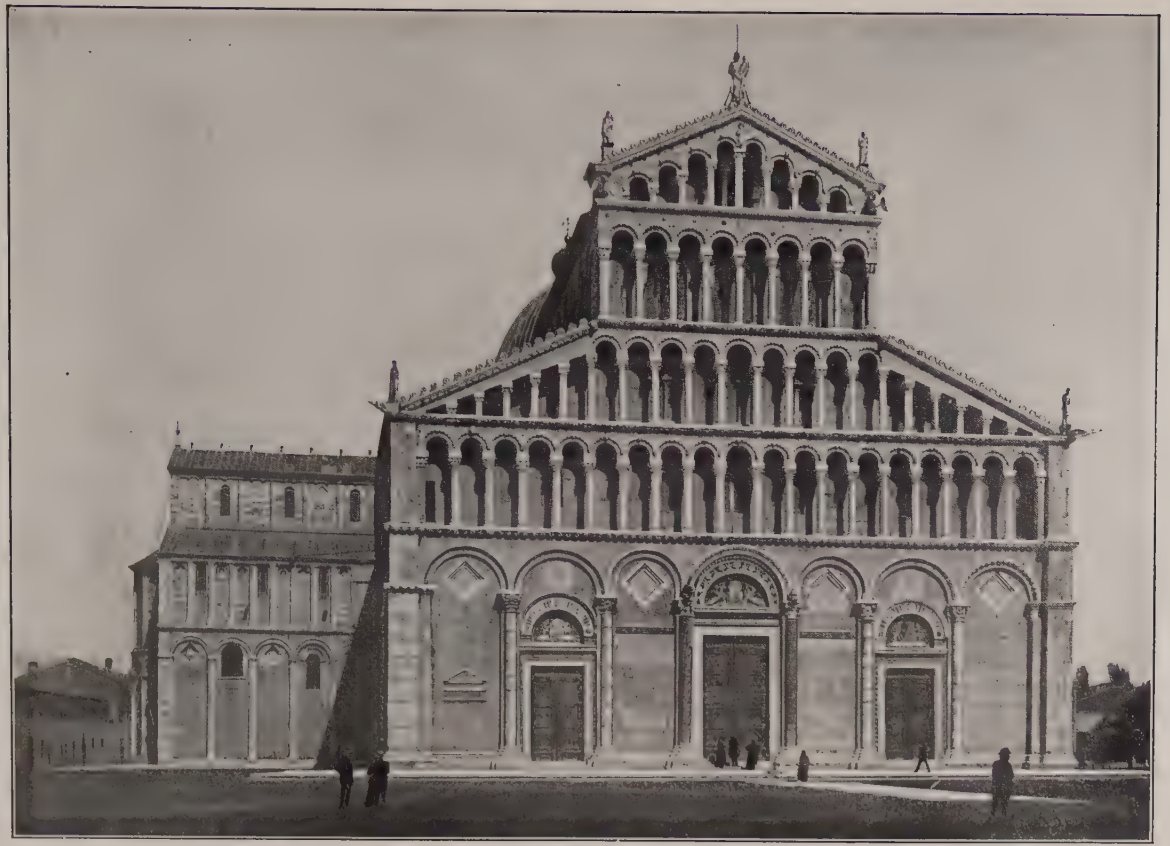


Fig. 27

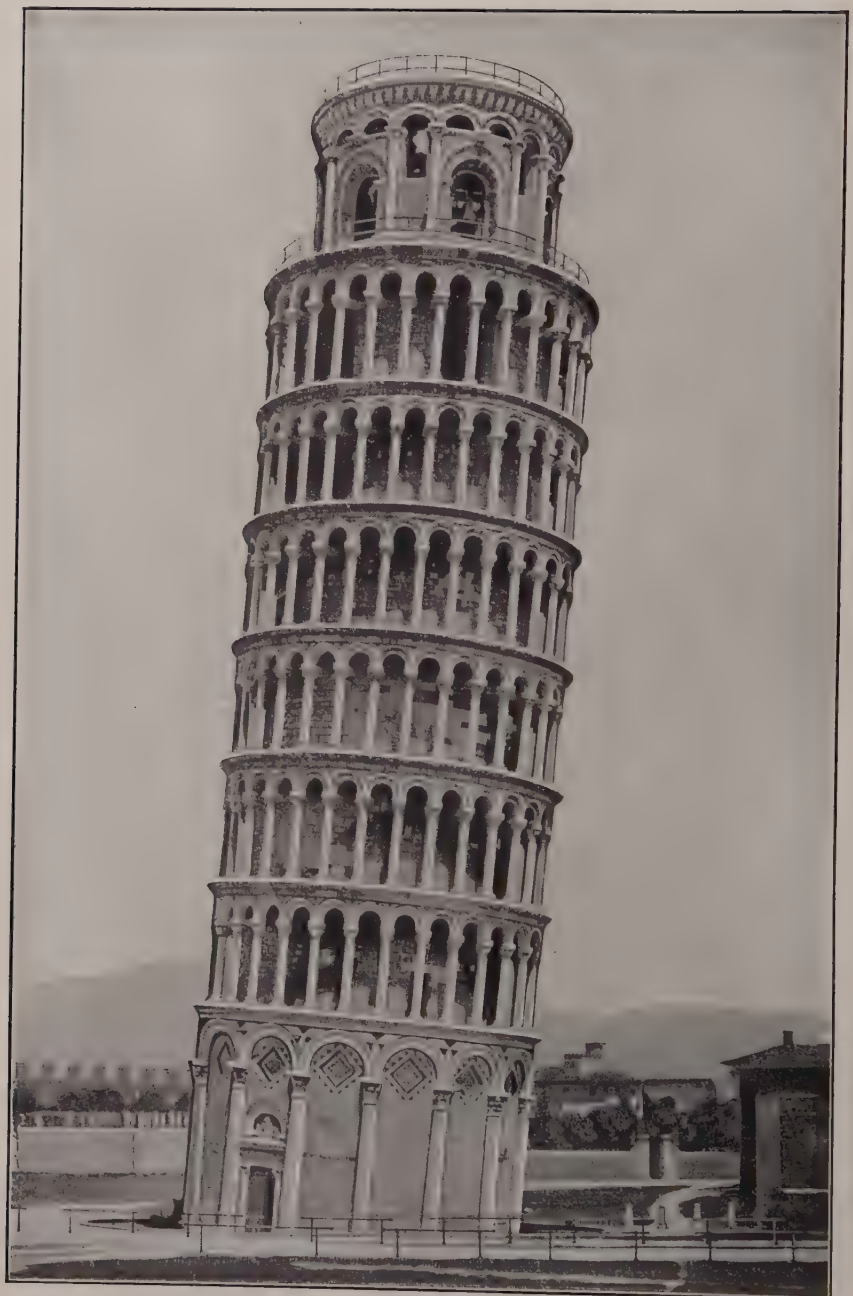


FIG. 28

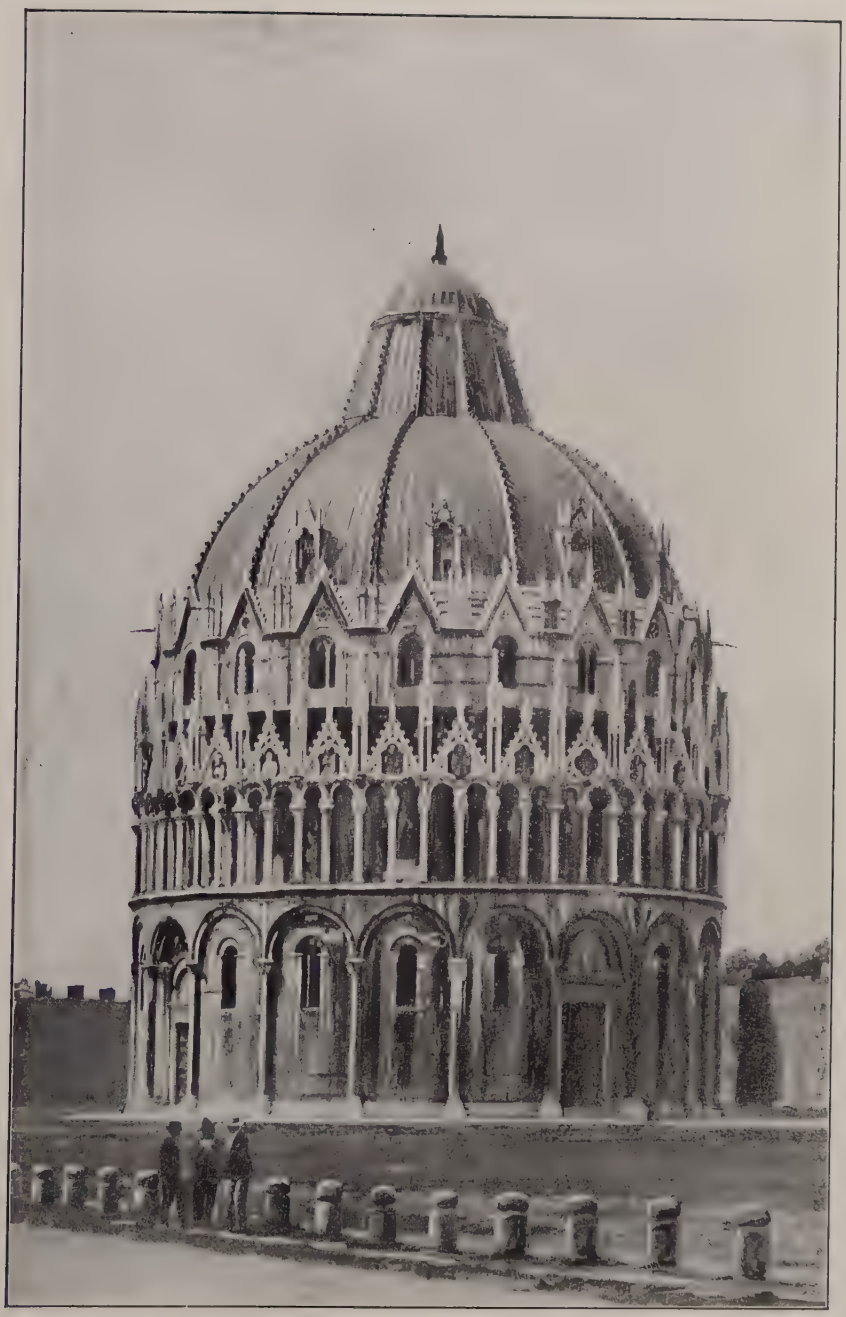


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FIG. 29

74. Leaning Tower at Pisa.—The leaning tower, Fig. 28, located at Pisa, is also characteristic of the Central Italian style of Romanesque, particularly in the arrangement of its superimposed arcades.

75. Baptistery at Pisa.—The baptistery at Pisa, Fig. 29, is built of marble, and on the first story is surrounded by half columns connected by an encircling arcade. There are many later additions that give this structure a Gothic character, so that above the first story it should not be classed in the Romanesque style.

76. Cloisters of St. Paul's.—The cloisters of St. Paul's Church at Rome, Fig. 30, are of more than ordinary interest. They are vaulted over square bays and arcaded in groups of four or five openings. The columns are wonderful exhibits of the craftsman's skill, being designed as twisted shafts and inlaid with glass mosaics in beautiful and intricate patterns.

NORTHERN ITALIAN ROMANESQUE

CHARACTERISTICS

77. In Northern Italy, the arcades that decorate the exteriors are restricted to the gables and minor details, instead of being carried through several stories as in Central Italy. The façades are wide and unbroken by any details to mark the nave and the aisles characteristically. The main entrance is sometimes protected by a porch whose columns rest on carved lions, and over this porch a circular window lights the nave. Stone and brick being the principal materials, the exteriors are less elegant than the marble façades of Central Italy. The carved details show scenes taken from the hunt and other pastimes characteristic of the northern invaders, and the grotesque element is prominent, being a decided digression from classic influences.

The churches are mostly of the basilican type and are generally vaulted and roofed. The aisles are frequently

FIG. 31

two stories in height, omitting the clearstory in the nave. Chapels are built along the side aisles, the walls that separate them serving as interior buttresses.

The campaniles, or bell towers, which were not attached to the buildings, but set at a distance or connected by cloisters, are also characteristic of the style in this section of the country.

EXAMPLE

78. Church of San Michele.—The church of San Michele, at Pavia, Fig. 31, shows the characteristic Northern Italy façade with the colonnade along the gable.

The façade is simple and constructed of irregular-sided stone laid with wide joints. Carved ornament frames the portals, which are deep and splay outwards from the doorway to the face of the walls. Over each portal a figure is carved, and horizontal bands of ornament are arranged in the courses of the lower part of the front. The plan is vaulted in square bays, and slightly projecting buttresses mark the width of the nave on the façade. There are no projecting side buttresses on the exterior, but buttresses to receive the vault thrusts exist on the interior, and form dividing lines between the chapels.

SOUTHERN ITALIAN ROMANESQUE

79. The influence of Oriental art—both Byzantine and Mohammedan—is observable in all the South Italy constructions. The cathedral of Monreale, near Palermo, Fig. 32, is a characteristic example. The plan is typically basilican, but the columns of the nave support Byzantine capitals. Rich-colored mosaics adorn the walls and are surrounded by arabesques of Mohammedan origin. The columns of the cloisters, shown in Fig. 33, are richly worked in mosaics and carved relief, the designs varying in alternate groups, with an indiscriminate intermixture of Byzantine and Mohammedan detail. This is also evident in the interlaced borders around the door shown in Fig. 34.

Fig. 32

197 FIG. 33

FIG. 34

ANALYTICAL STUDY

80. The plans in the Italian Romanesque style were mostly on the basilican order, with the choir raised to permit a crypt below. Circular examples exist, as baptistries.

The walls were pierced by open arcades in a single course of arches in the north of Italy, but by a series of several galleries in the central part. Projecting porches resting on carved lions mark the entrances in Northern Italy, while circular windows light the nave.

The openings were small, particularly in the central and southern portions, where the light is strong and the heat excessive. Blind arches of colored materials were designed in the walls, to overcome the absence of window details.

The roofs were either vaulted or timbered, as in the basilicas of Rome, and where the timber work was exposed, great decorative detail was applied.

The columns were built up as square piers with half shafts attached, especially in the north, where vaulting was more generally practiced, and the buttresses existed almost entirely on the interior of the buildings as separating partitions for the numerous side chapels.

The ornament consisted of crude, grotesque designs representing men and animals, varying in subjects from hunting scenes in the northern examples to apostolic processions and symbols in Central Italy. Southern ornament is characterized by decorative bronze doors, as at Monreale, Fig. 34, and geometrical mosaics and carved running ornament of Mohammedan and Byzantine origin. Colored-glass windows formed no characteristic part of Italian Romanesque, owing to the smallness of the openings. Northern and Southern Italy were strongly opposed to each other in decorative subjects, owing to the different geographical influences. Southern Italy, being nearer to the Byzantine and Mohammedan countries, absorbed decorative ideas from these neighbors, while Northern Italy, being close to the hunting tribes of the mountains, introduced the hunt as a theme for their decorations.

FRENCH ROMANESQUE

INFLUENCES

81. Geographical.—France lies between Rome and Northwest Europe, and during the greatest days of the

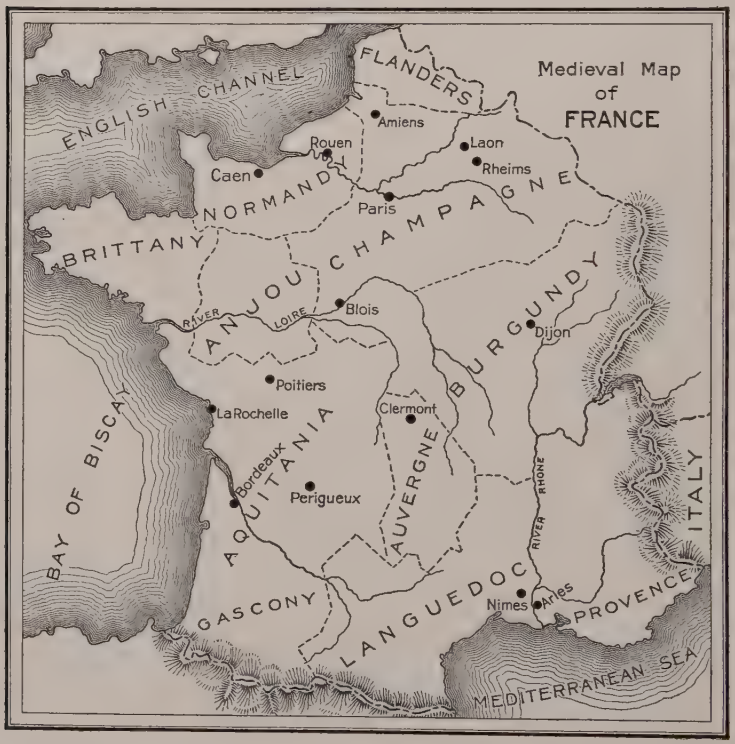


FIG. 35

Roman Empire, it was by way of Provence and the river Rhone that civilization spread to the north (see Fig. 35).

82. Geological.—Stone is abundant throughout France, and consequently most of the structures in that country are built of this material. The soft, fine stone of Caen was not only used throughout Normandy, but was shipped across the English Channel in later years and influenced the architecture in England. In Auvergne, a volcanic material found in the mountains was used in some constructions, giving a soft-colored bloom to the buildings.

83. Climatic.—The climate of France varies from a tropical condition on the Mediterranean to a cold and foggy atmosphere on the English Channel. It is warm on the west coast, owing to the fact that the Gulf Stream closely approaches the shore.

84. Religious.—Christianity, when it spread through France, took a firm hold in the Rhone Valley. In this district, the Cistercian monks enacted severe rules as to the character of church buildings that materially affected the local style.

85. Political and Historical.—Up to the end of the 10th century, the greater part of France had been held by independent lords and nobles. In 927 A. D., Hugh Capet, one of these lords, elected himself king, united the provinces into a feudal monarchy, and selected Paris as his capital. This was the beginning of France. As the king could exercise little authority beyond his capital, lawlessness was rife throughout the country, and architecture made little or no progress until a more settled state of affairs set in. During the weak reigns of the descendants of Charlemagne, Northern France was invaded by the *Northmen*, a tribe from Northern Europe under their leader Rollo, who settled and gave name to Normandy.

In 1066, the Normans, under William, a descendant of Rollo, crossed the Channel and conquered England. William ruled as king of England and retained Normandy as a province—a circumstance that subsequently gave rise to frequent wars between England and France.

CHARACTERISTICS

86. In Southern France is found an adaptation of Roman features without any servile copying of individual forms. Vast interiors enclosed by massive walls seem to have had their origin in the Roman *thermæ*, or baths, rather than in the basilican plan; and the Byzantine system of construction, without its elaborate decorative effect, can be seen in Gascony.

In the north, the style shows the first steps in the coming change to the Gothic system of construction. The interiors were very impressive, great loftiness of the naves being a strong characteristic, and the vaults were ponderous, being supported on massive piers. In the valley of the river Loire, vaulting made rapid progress in constructive ingenuity, but the system practiced in the north differed from that in the south. In the south, the nave was covered by barrel vaults, after the Roman fashion, but the thrust was resisted by half vaults two stories in height extending over the aisles. In the north, groined vaults were built over a square compartment, in the nave, executed in sexpartite vaulting, the ribs or groins of which were constructed independently of heavy stone and the infilling inserted afterwards.

87. As there are peculiarities traceable to the local conditions in both Northern and Southern France, the country must be considered in two sections, the river Loire conveniently forming the dividing line.

Along the Rhone Valley, which had been originally settled by the Romans, is found the strongest classic influences, as at Nimes and Arles.

Southern France can be divided into five provinces: Aquitania, Auvergne, Provence, Anjou, and Burgundy (Gascony and Languedoc were originally included with these). In Northern France are Paris and its environs (Champagne, Flanders, etc.) and the provinces of Normandy and Brittany.

In Aquitania are found two systems of construction, one with round, arched, tunnel vaults, of Roman origin, and the

FIG. 36

other with spheroidal domes supported on pointed arches, indicating Byzantine influences.

The churches of St. Croix and Notre Dame, Figs. 39 and 40, are of the former, while the church of St. Front, at Perigueux, Fig. 36, is of the latter class. St. Front was the prototype of domed churches in France.

Auvergne being a volcanic district, the principal local characteristics are due to the use of various colored lavas as building material.

Provence has today many examples of the 11th- and 12th-century architecture, showing classic influences in the vaulting.

Anjou examples are rich in decorative treatment.

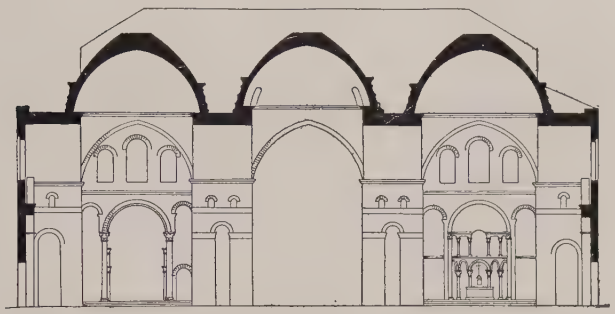
Burgundy was a province rich in monastic buildings, which exercised much influence over the architecture of other ecclesiastical structures.

In Normandy, many fine buildings were erected, owing to the power and prosperity of the Norman dukes. The examples are of the basilican plan, with vaulted roofs, which show the gradual development toward the pointed arch.

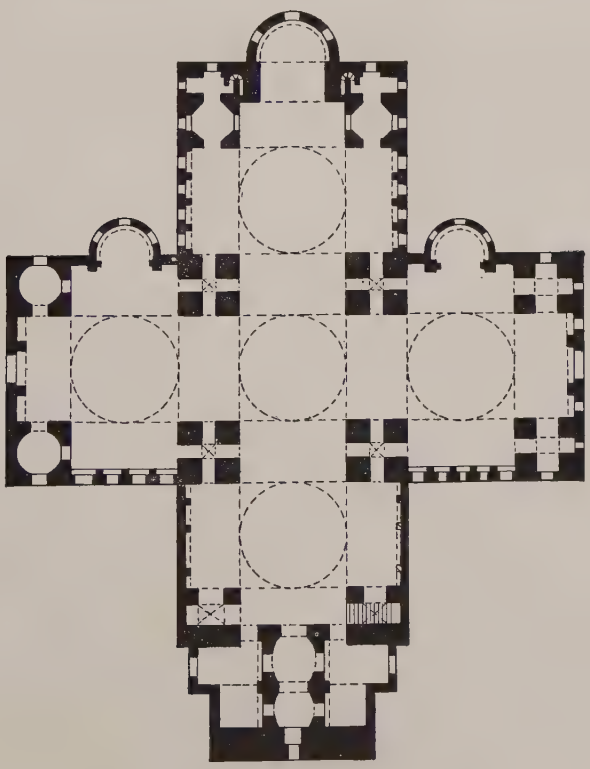
EXAMPLES

88. Church of St. Front.—The church of St. Front, at Perigueux, Fig. 36, presents one of the most important examples of the Romanesque period in Southern France. It was the work of the Romanesque builders, but owing to the trade that Southern France carried on with the Orient, and the taste acquired by returning pilgrims from the Holy Land, a strong Byzantine influence was brought to bear on the construction, and it presents a domical design.

The plan, Fig. 37 (*b*), was undoubtedly patterned after St. Mark's Church, at Venice, but the domes over the arms and crossing are all of one size and are surmounted with lanterns as shown in Fig. 36. Unlike St. Mark's, however, the interior, Fig. 38, is extremely plain. No Oriental marbles embellish the walls here, nor do elaborate mosaics incrust



(*a*)



(*b*)

FIG. 37

FIG 38

the dome soffits; but simple and imposing construction gives scale to the interior and an expression of grandeur equal to that attained by its more elaborate prototype. Fig. 38 shows clearly the great rectangular piers, pierced in two directions with passages and supporting the pendentives above, which are crowned with the great hemispherical dome. Compare Fig. 38 with Fig. 37 (*a*), Fig. 10, and Fig. 2.

89. Church of St. Croix.—Not far from Perigueux, on the western coast of France, is the city of Bordeaux, in which is located the church of St. Croix, Fig. 39. This

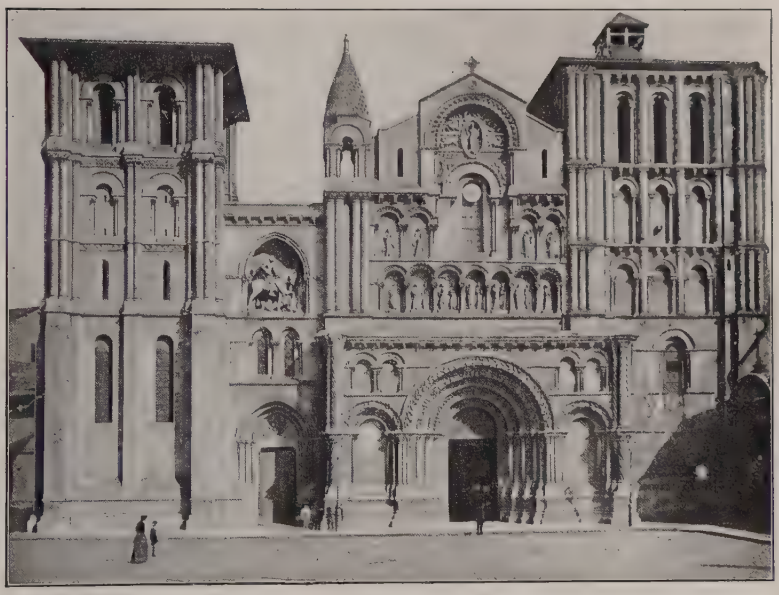


FIG. 39

edifice was originally founded in about the 7th century, but it was rebuilt in the 10th century and has been restored several times since. The façade is characteristically Romanesque with its blind arcades and recessed portals, and elaborate sculptured figures fill numerous niches. Most of this sculpture has fallen into decay, however, and the only

recognizable details are the signs of the zodiac, under the arch of the central gable, and a statue of a knight slaying a dragon, in a niche over the side portal. Superposed columns supporting arches are used here, but there is no suggestion of an imitation of classic design. There are sill courses marking the stories, but no entablatures are placed

Fig. 40

over the columns. Columns are clustered in groups of two or three or more—not according to any classic rules, but to suit the conditions arising in each case.

90. Church of Notre Dame le Grande.—In Fig. 40 is shown the church of Notre Dame le Grande, at Poitiers. This is one of the most characteristic Romanesque edifices of Central France, and was built in the 12th century, when

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Fig. 41

external sculpture and internal mural decoration were the prevailing means of attaining architectural expression. The western façade of this structure is richly sculptured

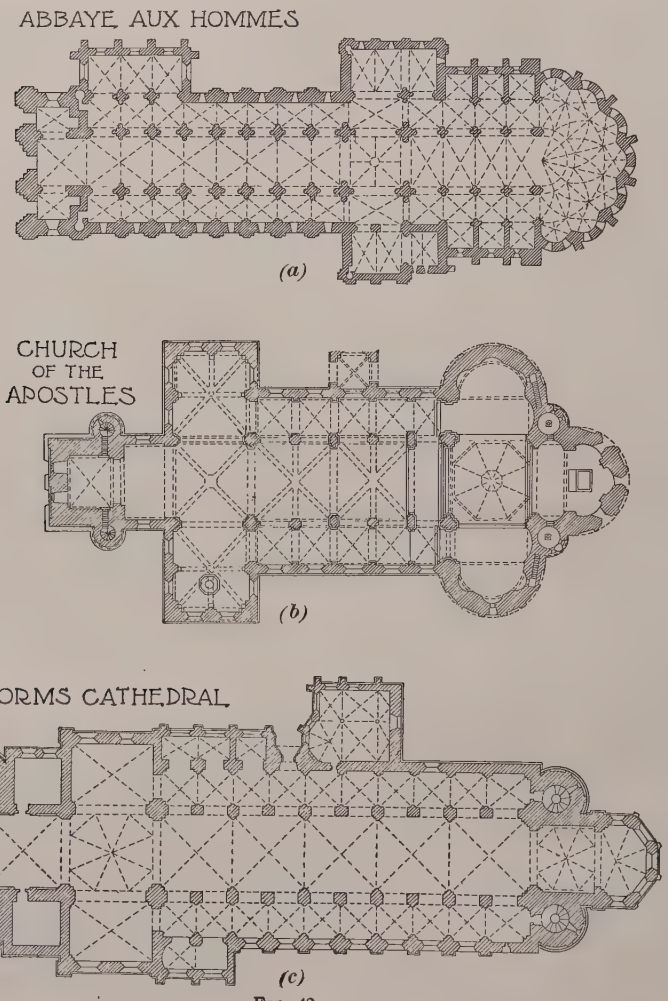


FIG. 42

with surface ornament, as well as with statues of saints, kings, bishops, and other symbolic effigies. Though not the largest, this church is probably the most interesting one

in the province, as it surpasses every other structure in the richness of its decoration. The central window was originally circular, but in the 15th century it was cut down to give more area for stained glass.

91. Abbaye Aux Hommes.—The Abbaye aux Hommes, Fig. 41, at Caen, was commenced in 1066 by William the Conqueror. The plan originally had an eastern apse, but this was altered to the semicircular *chevet* termination so characteristic of the French style [see Fig. 42 (*a*)]. The *chevet* consists of a continuation of the aisles around the east end of the nave, so as to form an *ambulatory* or passageway for the religious processions that were introduced into the church ritual about this time.

ANALYTICAL STUDY

PLANS

92. The plans in the south were broad and open with internal buttresses, between which chapels were arranged, while in the north they were more like the basilica, with external buttresses to receive the thrust of the roof vaults.

WALLS

93. The walls were massive constructions of rubble with a facing of fine ashlar. The doorways were elaborate, but the rest of the façade was left in the simplest possible form. Imposing western entrances are characteristic of this style. The buttresses have only very slight projection, and flying buttresses were introduced in the last half of the 12th century. The towers were mostly square with pyramidal roofs.

ROOFS

94. In the south, the roofs consisted of a barrel vault over the nave with half vaults over the aisles, which, being two stories in height, would not admit the introduction of a

clearstory. In the north, an increased clearstory was characteristic, owing to the use of intersecting vaults in the nave and grouped windows in the spandrels. The groin ribs of the nave vaults were maintained by buttressed arches under the aisle roofs, which received their thrusts.

COLUMNS

95. In the naves, square piers with half-round columns attached to their faces supported the groin ribs; or columns, with capitals suggestive of Corinthian style, received the groin ribs rather clumsily on the abacus.

OPENINGS

96. In the south, the openings were narrow, with wide splay of the jambs, and the clearstory was usually omitted. In the north the openings were grouped in series of three and five narrow windows, to fill the spandrel of the vaults in the clearstories. Portals were extremely ornate.

MOLDINGS

97. Moldings in the south are neat and refined, due to classic influence, but in the north, they are crude devices cut with an ax on the structural details. Corbel tables supported by either grotesque heads or plain blocks form the cornices along the main walls.

ORNAMENT

98. Painted glass did not enter into the designs in Southern France, as the windows were small and narrow and thus did not favor its display; but its use was gradually developed for the large openings in the northern buildings. The northern buildings presented much decorative diaper treatment in the spandrels of the arches that probably arose from an attempt to imitate in carving the color patterns of draperies that originally occupied the same positions.

GERMAN ROMANESQUE

INFLUENCES

99. Geographical.—During the days of the Roman Empire, cities had been established on the banks of the Rhine and to the south of it, and, when Christianity spread over Europe, these parts were affected first, while, in the north and east, paganism still flourished (see Fig. 43).

100. Geological.—Stone was abundant along the Rhine, but in the northern plains there was none. Consequently, the character of the buildings in these two districts varied accordingly.

101. Climatic.—Germany is subject to extremes of climate. In winter there is much snow for four months, and in summer the weather is decidedly warm, though not excessively hot.

102. Religious.—Charlemagne being a strong supporter of Christianity, forced his religion on the Saxons. The conversion of the barbaric tribes made the ceremony of baptism one of great importance.

103. Political and Historical.—After the death of Charlemagne (814 A. D.) the portion of his empire that fell to Lewis (see Fig. 26) became one of the three great subdivisions. The chief power in the country gradually became vested in the great dukes and lords, just as had been the condition in France. In 911 A. D., the last descendant of Charlemagne died, and as there was no satisfactory heir to the throne, five of the great dukes got together and elected Conrad, Duke of Franconia, as their king. Thus Germany began as an elective kingdom. On the death of Conrad, a Saxon duke named Henry was elected king, and he was

the first of five Saxon kings under whose reigns Germany was to become the greatest power in Europe. Otho, successor of Henry, extended the boundary of the German Empire southwards to include Lombardy. After the subdivision of Charlemagne's dominion the Roman Empire ceased to exist, but with the establishment of the temporal power of the church, it was desired that the church should extend its influence and power over as wide a domain as

Fig. 43

possible. Otho being an ardent churchman, as well as an ambitious sovereign, acquiesced in this idea, and in 962 A. D. he was crowned at Rome as emperor of the Holy Roman Empire of the West. Thus, a portion of the divided empire of Charlemagne became united. From this time on each German emperor received three coronations—as king of Germany, as king of Italy, and as emperor of the West.

CHARACTERISTICS

104. The general style of German Romanesque architecture is similar to that of Northern Italy, and though the Rhine districts present the best examples, there are fewer local characteristics than are found in France. Numerous circular and octagonal turrets with arcaded galleries under the eaves characterize the style. The church plans show no western entrances, but present apses instead, Fig. 42 (*b*) and (*c*). The doorways are richly ornamented, and the capitals of the columns are bold in execution and unique in design. Vaulting appears about 50 years later than in France, and was first adopted in the provinces along the Rhine. The round-arched style, similar to that of Lombardy, lasted in Germany until about 1268 A. D.

EXAMPLES

105. Church of the Apostles.—The church of the Apostles, at Cologne, Fig. 44, is only one of several in that city that presents the leading characteristics of the German Romanesque style. The eastern end is carried out in three apses that open from three sides of the nave and are crowned by a low, octagonal tower, Fig. 42 (*b*). The exterior is richly treated, and presents arcaded subdivisions crowned by a characteristic arcade of small arches under the eaves of the roof. The existence of these small arcades under the eaves of the structures in Germany and Lombardy is interesting, inasmuch as they are based on a structural condition. The buildings not being vaulted in these countries, there was no thrust on the upper walls; consequently, a light form of construction was permissible here for the purpose of supporting the beams of the roof.

The walls had simply to support the superimposed load of the roof and roof trusses and did not have to withstand a horizontal thrust from vaults. There were therefore no flying buttresses over the aisles although fixed buttresses were necessary to support the aisle vaults.

Fig. 44

Fig. 45

FIG. 46.

106. Cathedral at Worms.—The Worms Cathedral, Fig. 45 (also those of Speyer, Mentz, and Treves), is a characteristic structure of this period. On each side of the eastern and the western apse stand circular towers, while a low, octagonal tower marks the intersection of the nave and the transept. The walls are pierced with semicircular-headed windows that are flanked by small pilaster buttresses, and the entrance doors are at the sides, as is characteristic of many of the German churches [see the plans, Fig. 42 (*b*) and (*c*)].

The interior of Worms Cathedral, Fig. 46, shows the characteristic German Romanesque arrangement. Semicircular ribs laid up in small cut arch stones extend diagonally from one corner of a bay to another, while the transverse ribs in slightly pointed arches separate the bays from one another. The nave wall is supported by rectangular piers, on every other one of which a semicylindrical shaft rises to the clear-story to receive the vault ribs. Two arches of the aisle vaults are included under each bay of the nave vaults.

107. Cathedral at Speyer.—The Speyer Cathedral, Fig. 47, presents square towers where those of the Worms Cathedral are round, while a light arcade under the eaves of the roof indicates the absence of vaulting, as in the Italian Romanesque.

108. Cathedral at Bonn.—The cathedral at Bonn, Fig. 48, introduces an octagonal tower of two stories with a tall spire over the intersection of the nave, but otherwise it presents practically the same features as the cathedral at Speyer.

109. All of these great churches are noteworthy for their picturesque grouping of external details and the successful combination of large and small turrets in one composition. The characteristic use of arcades in the exterior walls and the open arcades under the eaves render these German examples unique among the Romanesque structures in other countries, although the system of design was undoubtedly derived from the churches of Northern Italy.

FIG 47

FIG. 48

ANALYTICAL STUDY

PLANS

110. In the German Romanesque style, the naves and aisles were vaulted over square bays, one bay of the nave receiving two from the aisles, as the latter were usually half the width of the nave. The choir ended in an apse, and was always raised over a crypt, as in Lombardy. Transepts were introduced at the west end as well as at the east, detracting somewhat from the cruciform plan, but they were nearly always crowned with low, octagonal towers. Numerous square or cylindrical towers added to the exterior effect. These towers are generally constructed in successive stories and finished under four gables and a steep, pyramidal roof, the hip rafters rising from the ridge of the gables, as in Fig. 48, and sometimes from the valleys between them as well, as in Fig. 47.

WALLS

111. The walls present open arcades under the eaves and string courses, or cornices consisting of horizontal arcades, resting on corbels. There is always a clearstory and occasionally a *triforium*, or open space, between the clearstory and aisle vaults.

ROOFS

112. Along the Rhine, barrel vaults covered the nave, and half vaults extended from the walls over the aisles to the base of the nave vault. Where the spans were excessive, timber trusses were used. Characteristic gabled and pyramidal roofs covered the towers, as heretofore described.

COLUMNS

113. Square piers with half columns attached were used in the nave, and in many churches a characteristic arrangement consisted of alternate piers and columns. The capitals are boldly executed and designed with care and intelligence.

OPENINGS

114. The openings are usually single, but occasionally they are subdivided by mullions, as in Fig. 49 (*a*), which

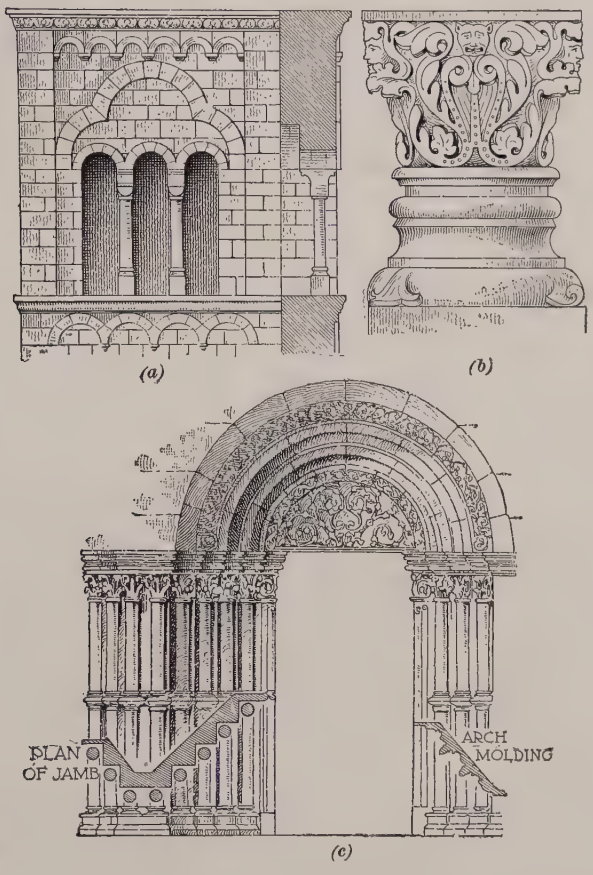


FIG. 49

shows an example from the Laach Abbey Church. The doors are placed at the sides and rarely at the ends.

MOLDINGS

115. The moldings are of little importance and form no characteristic part of the style. The bases of the columns, however, show a divergence from the classic proportions, and suggest ideas that develop in a later style.

ORNAMENT

116. The flat, plain surfaces on the interior walls were sometimes frescoed in colored designs that expressed the ideas set forth in the early Christian and Byzantine decorations. In the northern part of Germany, colored bricks and tiles were used, but being unsuitable for rich decoration there is an absence of sculptured foliage.

The arches of the portals, when of stone, were richly carved, as may be seen in Fig. 49 (*c*), which is an example from the Worms Cathedral, as are also the capital and base shown in (*b*). The introduction of a leaf form on the corners of the plinth, to fill the triangular space caused by the moldings at the base, is characteristic of this period. Fig. 50 (*f*).

117. In Fig. 50 (*c*) is shown a 13th-century capital from Southern Germany, the treatment of the foliage on which is extremely simple and thoroughly pleasing. It is lighter than either the French or Italian examples shown at (*a*) and (*e*), respectively, and its conventional foliage seems to grow from the top of the shaft. The base at (*f*) is also German, but differs only slightly from the French bases at (*b*) and (*d*).

118. The running ornament illustrated in Fig. 51 is carved in high relief. The example at (*a*) was taken from Southern Germany, and is much heavier in detail than the French example at (*b*). The pyramid forms shown on the main stem of the ornament at (*c*) are characteristic of the Romanesque style, and are found at this period throughout Western Europe. The band shown at (*d*) is a trifle more intricate than the others, but presents the same simple elements as the example shown at (*a*).

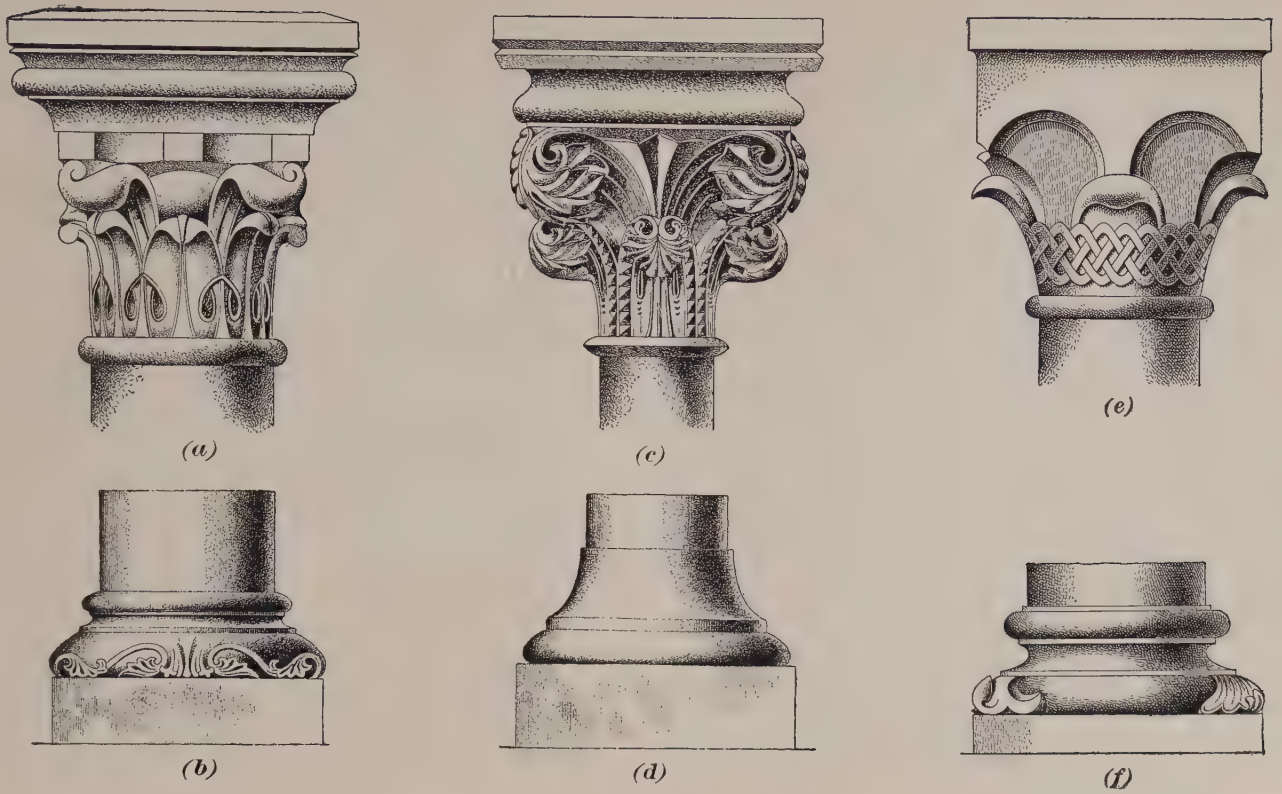
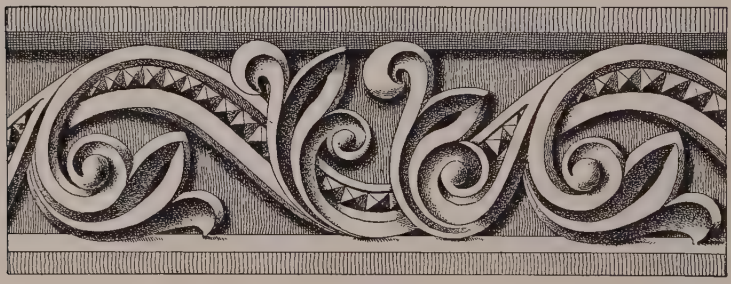


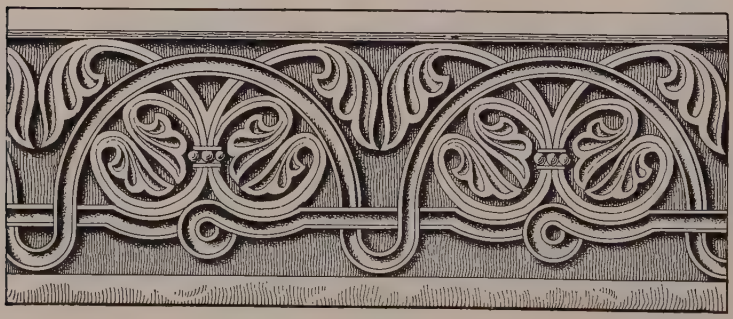
FIG. 50

(*a*)

(*b*)



(*c*)



(*d*)

FIG. 51

THE CRUSADES

(1096 A. D. to 1270 A. D.)

119. During the two hundred years comprising the 12th and 13th centuries, the most important developments in European history were affected by a series of extraordinary expeditions known as the *crusades*, a word of French derivation meaning "wars of the cross." Since the latter part of the 7th century, Syria and Palestine had been in the hands of the Saracens and Turks, both of whom were Mohammedans. It had long been the practice for ardent Christians to make pilgrimages to Jerusalem, and while the Saracens remained masters of the Holy Land these pilgrims were cordially received, as a considerable amount of revenue and trade was thus brought to that country.

In the middle of the 11th century, however, the Seljukian Turks became rulers of Syria and subjected the Christians to the cruelest persecutions. Returning pilgrims told sickening stories of insults and degradations that had been heaped on them by the "infidels," and a spontaneous desire arose throughout Europe to exterminate the Mohammedans, and rescue the Holy Land from their domination. A French monk, Peter the Hermit, born at Amiens, was a victim of some of these Moslem cruelties, and believing that he was inspired by heaven to deliver Jerusalem, he laid the project of the first crusade before Pope Urban II. Encouraged by the pope, Peter traveled over Europe and preached that it was the sacred duty of all Christians to deliver the Sepulcher of Christ from the infidels. As a result, a great multitude from all parts of Europe assembled, on call from the pope, at Clermont, France, in 1095 A. D. Unfortunately, in their enthusiasm, they were carried away by the eloquence of Peter and urged him, as the original preacher of the sacred enterprise, to assume its command, and, not knowing his

utter unfitness for military command, Peter accepted the charge.

120. First Crusade—1096 to 1099.—In August, 1096 A. D., an unorganized army of over 250,000 men started as an advance guard on a march through Germany, Hungary, Bulgaria, and Thrace (see Fig. 52). This army expected to live by forage and conscription as it proceeded, but its lawless acts and devastations so enraged the Hungarian peasantry that they attacked the crusaders and nearly exterminated them before they reached their goal, and the few that succeeded in getting across the Bosporus were immediately

Fig. 52

massacred by the Turks. Such was the fate of the vanguard of the first crusade.

121. The chivalry of Europe had taken no part in this preliminary movement, but now it prepared to follow the vanguard. Six armies, each consisting of 100,000 men, started by different routes (see Fig. 52) from separate countries for Constantinople. Here all the divisions united, under Godfrey of Bouillon, duke of Lower Lorain, and 100,000 mailed cavalry, the flower of European chivalry—knights, esquires, and men at arms—marched across Asia

Minor. They were equipped with full armor, and were armed with lance, sword, and battle ax or heavy iron mace. The foot soldiers were armed with longbows and crossbows, and presented a strong contrast to the splendor of the knights with their embroidered and ermined surcoats, dazzling shields, and headpieces inlaid with gold and jewels. As soon as they entered Asia Minor, the sultan of Roum, with 300,000 cavalry, attacked them, but the heavy-weaponed and armored knights and horses of the crusaders were too much against the light weapons and supple dexterity of the Asiatics. In a direct charge, the Turkish cavalry was routed and 30,000 slain. This was probably the greatest cavalry battle in the world's history. The retreating Turks, however, devastated the country through which the victors had to march, and hundreds of the crusaders died of famine and disease before they arrived at the city of Antioch, the capital of Syria, to which they laid siege. Seven months later the crusaders captured the city and marched on to Jerusalem. For five weeks Jerusalem was besieged, but in July, 1099, Godfrey and his army entered the city and celebrated their great Christian victory by the massacre of 70,000 Moslems and the burning of the Jews in their synagogues. Thus ended the first crusade, and Jerusalem was now a Christian kingdom after 450 years of Mohammedan rule.

122. Second Crusade—1147 to 1149.—In 1145, the Turks attacked the Christian principality of Edessa and massacred the inhabitants. St. Bernard, abbot of the monastery at Clairaux, preached a second crusade as a punishment to the infidels, and his eloquence enlisted the sympathies of the two most powerful sovereigns of Europe, Conrad III of Germany, and Louis VII of France.

The two armies, consisting of over 300,000 chosen troops, marched by the same route as the first crusaders to Constantinople, but they were badly defeated and returned to their homes without accomplishing anything.

123. Third Crusade—1189 to 1192.—The third crusade was caused by the invasion of Palestine by the Turks

and the fall of Jerusalem in 1187. Tyre now remained the only Christian settlement in Palestine. The third crusade was conducted by Richard I of England, Philip Augustus of France, and Frederick I of Germany, and ended in a truce with the Turks.

124. Result of the Crusades.—There were five later crusades, but none of them achieved any result; in fact some of them were not directed toward Jerusalem at all. Although the crusaders failed utterly to accomplish their immediate object—the recovery of the Holy Land from the Mohammedans—their effects were most important on the development of western civilization. Western nations having come to act together in a common cause, became better acquainted, exchanged chivalrous sentiments, and entertained more liberal ideas. The returning crusaders brought from the East knowledge of many processes and products tending to promote the arts and industries of the West. These expeditions were the beginning of international commercial relations. The Italian maritime states furnished the crusaders with transports and conveyed their troops and supplies, thus first establishing the commerce of the Mediterranean. A demand for spices, perfumes, and other articles of Oriental luxury was imported into Europe. Trading posts were established on the coasts of Asia Minor and Greece by Venice, Genoa, and other Italian states. Another important effect of the crusades was the diminishing of the strength of the feudal aristocracy through the division and sale of many feudal properties.

It is evident that in the immense host that constituted these armies some designation other than a mere name was necessary to distinguish one nobleman from another; hence, we find the introduction of coats of arms and distinctive banners, and finally the use of surnames, which had heretofore been unnecessary.

From the 11th to the 13th century, the crusaders returning from the Orient introduced new ideas and aided in the foundation of the great universities. With the spread of

education and enlightenment, the feudal system began to decline, and finally, in 1500, when gunpowder was invented, warfare was revolutionized and the feudal system of government and defense became obsolete.

REVIEW EXERCISES

1. What geographical influences affected the architecture of Northern and Southern Italy?

2. What important religious influence affected the political conditions in Italy during the early Romanesque period?

3. What are the leading characteristics of (*a*) Northern Italian Romanesque architecture? (*b*) Southern Italian Romanesque?

4. (*a*) What are the characteristics of Romanesque architecture in the north and south of France? (*b*) What is assumed as the dividing line between Northern and Southern France?

5. (*a*) What is the most important Romanesque church in France? (*b*) After what was it patterned?

6. (*a*) What foreign influences affected the architecture of Southern France? (*b*) How came these influences to be introduced?

7. (*a*) What are the characteristics of German Romanesque? (*b*) What characteristics were due to the proximity of Northern Italy?

8. (*a*) What were the Crusades? (*b*) What effect did they have on the civilization of Western Europe?

9. (*a*) What is a chevet? (*b*) Of what style of architecture was it characteristic?

10. In what way did the absence of vaulting affect the Romanesque style of Northern Italy and Southern France?

GOTHIC ARCHITECTURE

(1200 A. D. to 1500 A. D.)

INTRODUCTION

125. An architectural style is now reached that, although developed by a process of evolution from the structural systems of ancient Rome, is, in its perfected form, entirely opposed to classic architecture in principle, purpose, and design. The term *Gothic* has been applied to this style because it was developed by the descendants of the Goths that overthrew the Roman Empire in 476 A. D. The term is a misnomer, however, for these early Goths were a barbarous, uncultured people, whereas Gothic architecture from the 12th to the 15th century was the embodiment of refinement and taste in both construction and design. The style developed from purely local conditions, and it can therefore be readily understood that the more remote from Rome, the purer one finds the art. For this reason, Gothic architecture found it greatest development in England, for that country was not only far to the north of Italy, but it was entirely isolated from the Continent by its surrounding water.

126. At the beginning of the 13th century, several of the nations of Western Europe were well established. The Western Roman Empire now had its center in Germany, and the kingdoms of Italy, France, England, and Spain were developing into individual states. By this time the Church had become a most powerful factor in civilization. The popes held themselves to be above the kings and emperors, and therefore dictated much of the political policy of the various governments.

The clergy, on account of their learning, were consulted in temporal affairs, and in this way received many individuals

of wealth and power into their religious orders. In Germany, many of the abbots and bishops were royal princes.

The general forms of Christianity had varied materially during the past few centuries. The bodies or portions of the bodies of the saints and martyrs were honored in the churches of the community wherein these celebrities had lived. The veneration of the Virgin Mary and other forms of ritual were the cause of some additions to the cathedral plans. Lady chapels, for the devotions to the Virgin, were erected in many of the religious structures, as well as smaller chapels for the reverence of various saints and martyrs. Chantry chapels, where masses for the dead were sung, found a place in many churches, and the numerous ceremonies requiring processions, etc. made necessary the introduction of an ambulatory, where they could take place.

Heretofore all important medieval buildings had been churches and abbeys, but now the growth of towns and consequent increase of wealth led to municipal rivalries and the erection of magnificent secular buildings. In Italy, the country became divided into small sections, to each of which belonged one or more of the larger towns. These sections afterward became principalities. In Germany, the towns united and formed *leagues* for mutual protection and the regulation of trade.

127. The climate of Northern Europe being entirely different from that of Southern Europe, a corresponding difference in architecture must be expected, but more than a mere difference of climate is to be looked for as responsible for the vast change in the system of design.

In Southern Europe the sun is high in the heavens during the day; hence, variation of light and shadow can best be obtained by low, projecting cornices, string courses, and other horizontal details. In the northern part, save at noon, the sun takes a low course through the sky not far above the horizon. Therefore, pinnacles, towers, and vertical elements are the details required to cast shadows and vary the monotony by light and shade.

CHARACTERISTICS

128. The principles of Gothic architecture were the same throughout Western Europe. Gothic construction of the 13th century was the direct outcome of the development of Romanesque vaulting. Its strongest characteristic is the persistent application of the pointed arch. As has already been shown, the fully developed Gothic vault was pointed, instead of semicircular like the Roman vaults, and as the window openings were in the bays of the aisle and nave directly under these vaults, it is not surprising that the window heads were made pointed in order to conform to the vault outlines. The form once adopted, became general, and the pointed arch was used everywhere for doors, windows, arcades, and vaulting.

129. The Gothic masons developed the scientific use of stone as a building material beyond anything heretofore known. They heaped it up in towers and pinnacles and carved it in delicate lacelike patterns until the roofs of their constructions showed a veritable forest of small spires. They constructed flying buttresses of it, to act as props to the thrusting superstructure, but designed to present a marvel of artistic ingenuity. They hung it in ponderous pendants from intersecting vault crowns, where a weight was necessary to offset an upward thrust, and finally they cut it in the thinnest of slabs for decorative purposes and executed designs that were marvels of construction and craftsmanship.

130. Every wall in Gothic construction was reinforced by a buttress, which was frequently carried up in a pinnacle to give it more weight and stability. Every arch thrust was counteracted by another arch thrust, until the force was scientifically taken up by buttresses and carried to terra firma. Gothic structures consisted of a skeleton of piers, columns, groin ribs, buttresses, and flying buttresses, the walls and infilling being mere enclosures. The walls were pierced by windows whose subdivision by mullions and split mullions resolved itself into a series of lacelike effects termed *tracery*.

Tracery itself presents the solution of some of the most complicated problems in geometrical construction that are known. These details of construction required other special details to fit them, and led to the introduction of entirely new forms of capitals, columns, moldings, and bases.

131. The architectural style was adapted to a construction of small, rectangular stones with wide joints, which was a compromise between the rubble walls of the Romans and the solid-block stone constructions of the Greeks.

The available stone was hard and durable and could be split into small sections, but there was neither marble nor granite that the Romans found plentiful in their domains. The Gothic architects were forced to construct large buildings from small blocks of stone in contrast to the small Greek buildings of large single pieces. The vaulting, as has heretofore been stated, was developed from the Romanesque, but it became more complicated as the style advanced, and the increase in the number and the variety in the design of ribs that necessarily ensued forms the most fascinating detail of the style.

132. Painted glass formed an important detail in the style, as the richly mullioned windows came to be regarded simply as frames for the wonderful transparent pictures teaching facts and details of Bible history and dogmatic theory. In Northern Europe, painted glass was the principal form of decoration. The interiors of the walls were kept as flat as possible, and piers and buttresses existed on the outside only.

133. The medieval cathedral occupied in its time a position similar to the modern school, library, museum, and picture gallery. Education emanated from the churches, as there were no schools, books, nor outside teachers. The sculpture and painted glass told eloquent stories of the creation of the world, the redemption of man, the reward of virtue, and the punishment of vice.

The construction of these buildings was not a matter of a few years nor even a lifetime. They were carried on from

generation to generation, and many structures that were founded in the 11th and 12th centuries remained unfinished at the time of the Reformation in the 16th century. Thus, in almost any one of them, the architectural developments may be traced over a period of four centuries.

134. The plans of these structures are usually Latin crosses, the short arms of which, extending north and south, are formed by the transept near the east end, and a tower usually surmounts the crossing. Two rows of columns divide the long arm into a nave and two aisles.

The piers each side of the nave are connected by arches, over which the side walls extend to the roof vault. The roof over the aisles reaches half way up these nave side walls, and the space between the aisle vaults and the roof over them is called the *triforium*, or blind story (see Fig. 62), while the wall of the nave above the aisle roofs is termed the *clearstory*, as it is pierced with windows to light the nave. Variations of these conditions characterize the cathedrals of different countries and individual buildings, but the general distribution in all cases is the same as just stated.

135. Besides the cathedrals and churches, there were the monasteries erected by the various religious orders for the education of novices in theology and probationary students in art, music, architecture, etc. Each of these religious orders was devoted to some one pursuit. The Augustinian monks favored preaching and theology. The Friars were missionaries. The Benedictine monks were the most learned, and to them is due the preservation of history through the dark ages. They taught illuminating and execution of manuscripts, for there were no printing presses in those days. The Cistercian monk was the friend of the poor, encouraging agriculture and industrial pursuits, and the Cluniac monk was the student and artist. A complete monastery included in its buildings a church, a chapter house, a sacristy, a dormitory, a capacious cellar for the storage of wines, beer, and oil, a refectory, or dining room, a kitchen, a lavatory, granaries, outbuildings, etc.

ENGLISH GOTHIC

INFLUENCES

136. Geographical.—England as an island with many bays and harbors was naturally a great commercial country (see Fig. 53). Her isolation assisted in the development of prominent national characteristics in her people, among the most important of which was the habit of travel in foreign countries. Thus, while her ships imported stone and other building material from foreign lands, her citizens acquired foreign ideas that influenced her architectural development without causing it to become a servile copy. Owing to her isolation and northerly position, England was less affected by Roman art than any of the other Christian countries; hence, the new architectural style developed with great purity.

137. Geological.—The varieties of building stone throughout the island affected the style locally during the early period, but as roads were improved and means of transportation became perfected, stone from all parts was imported where required. During the middle ages, stone was imported from Normandy in ships, as this was easier than conveying it by horses from remote parts of the island. Brick was also largely used in some communities, as were also terra cotta and soft limestone. In the forest districts, buildings were erected of wood, and many with an open-timber construction of part wood and part brick or stone.

138. Climatic.—The climate, though cool, does not admit of heavy frosts, and building can be carried on throughout the greater part of the year. But cold, high winds accompanied by fog and rain necessitate due protection against

these elements. Consequently, throughout England are found small entrances protected by deep porches, to exclude the weather.

139. Religious.—By the end of the 10th century, the greater part of Europe had embraced Christianity. The

Fig. 53

power of the Church, with its head at Rome, had so grown that the popes had in several instances overruled the civic authority of the kings. Attempts to establish in England an independence of Church influences had been repeatedly made

and failed, but the efforts did not take an extreme character until after the Gothic period.

The different religious orders had come into existence and were well established, their monasteries and other buildings exhibiting strong points of difference. Many of the English cathedrals were built over the foundations of old monasteries, which caused various irregularities of plan that are not observable in the continental cathedrals.

140. Political and Historical.—Rome withdrew her army from England about the year 420 and left the Britons to shift for themselves. In 450, Teutonic tribes from Northern Germany invaded Britain and drove out the native Britons or enslaved them. These barbarous tribes cared nothing for the Roman arts or language, and unlike the Franks and Goths, they did not adopt the religion and language.

The migration of these Teutonic tribes continued until the end of the 6th century, so at that time what had been a Christian province of Rome became the heathen land of the Angles and Saxons. At the beginning of the 7th century, Augustine, a Roman missionary, arrived in England and converted the Anglo-Saxons to Christianity, and, finally, in the early part of the 9th century, the country became a united Christian kingdom under the Saxon King Egbert, a contemporary and friend of Charlemagne. The country was then called England (land of the Angles).

In 1066, William, Duke of Normandy (see Art. **85**), crossed the English Channel, conquered the country, and caused a complete revolution in the manners and customs of the people by introducing from France the system of feudal government.

CHARACTERISTICS

141. The development of Gothic architecture in England is freer from foreign influences than in any other part of Europe. It can be divided into four general periods, including the late Romanesque, as follows: Norman or Romanesque, Early English, Decorated, and Perpendicular.

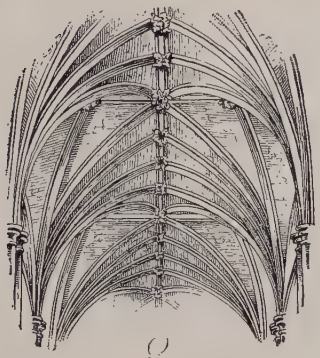
Preceding all of this there was an Anglo-Saxon style of English architecture that existed from the middle of the 5th to the middle of the 11th century (450 to 1066 A. D.). The buildings of this period were sometimes composed of fragments or were rude copies of Roman architecture executed largely in timber construction, and are of importance here only as a suggestion of the origin of much of the timber construction in the later Gothic styles in England.

142. The leading characteristic of each period of the English Gothic style lies in the system of vaulting and the distribution of the ribs over the soffits of the vault. Therefore, careful attention should be given to this detail. The evolution of the medieval vault from the Roman system has heretofore been discussed. Briefly, the Romans designed their vaults to fit the plan space to be covered without regard to the groins or intersections, which were left to take care of themselves. The medieval builders laid out the groin ribs first and then built the vault over them. Their problem was to cover with stone the nave of a church of the basilican plan and at the same time provide means of lighting the interior. The stone vault rendered the structure comparatively safe against fire, and a wooden roof was constructed above the stone vault, to keep out the weather. Now, from the Romanesque vaulting in the 12th century, each successive period is marked by distinguishing characteristics of the vault ribs.

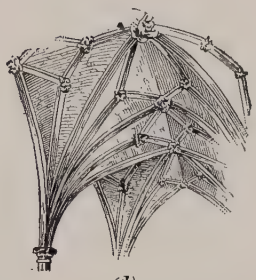
143. Norman Vaulting (12th Century).—The vaulting in England during the 12th century corresponded to the late Romanesque on the Continent, but varied from it somewhat owing to its remoteness from Rome. The semicircular diagonal rib was used largely with stilted arches at the springing of the transverse or longitudinal arches, as shown in Fig. 54 (*a*). The introduction of the pointed arch improved matters greatly, but even then semicircular ribs were used for the diagonals. Norman vaults and arches were semicircular, as may be seen in Peterborough Cathedral, Fig. 63, and were groined over square bays or over oblong bays, with the narrower arch stilted, or later on pointed.

(a)

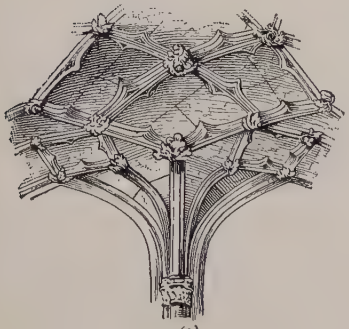
(b)



(c)



(d)



(e)

(f)

FIG. 54

144. Early English Vaulting (13th Century).—The Early English vaulting surmounted all the difficulties of difference in span by using the pointed arch over all plan arrangements and semicircular ribs for the groins. The ribs of all vaults were designed and built first, and then the surfaces between them were filled in with *severies*, or infilling, as shown at *d* in Fig. 55. The surfaces of these severies were seldom plain curves, but usually winding or warped surfaces so constructed that their weight and thrust were directed toward the pier supporting the ribs and not toward the wall ribs

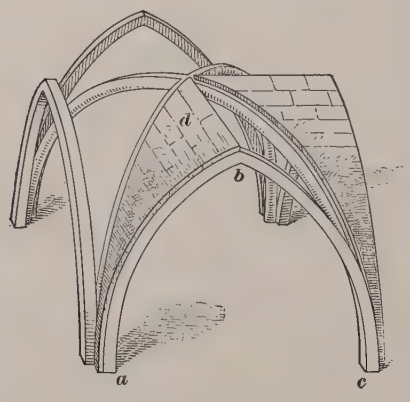


FIG. 55

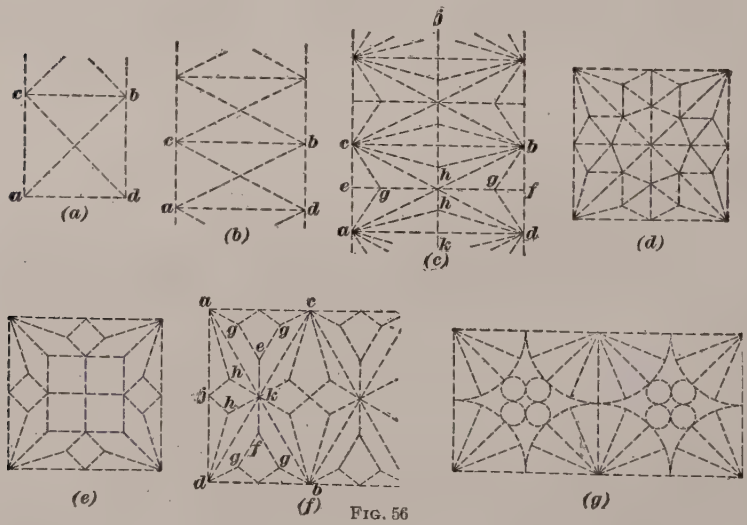


FIG. 56

themselves. The vaults were *quadripartite*, as the ribs divided them into four parts as shown in plan in Fig. 56 (*b*)

and in perspective in Fig. 54 (*b*). Later in the 13th century, extra ribs were introduced into the vaults between the transverse and diagonal ribs as at *cg*, *ag*, *ch*, *ah*, etc., Fig. 56 (*c*). These ribs increased the strength of the vaulting by reducing the area of the surfaces to be "filled in," and ridge ribs *ef* and *jk*, Fig. 56 (*c*), were then introduced to take up the thrust of these intermediates, as shown in Fig. 54 (*c*). Owing to the increase in number of ribs they became lighter in section and were richly molded with carved *bosses*, or buttons, at their points of intersection.

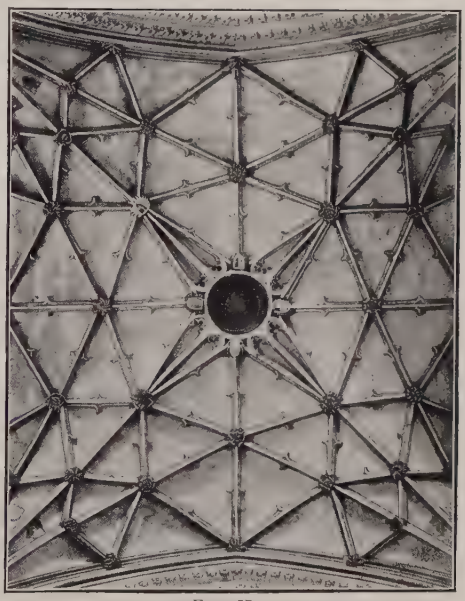


FIG. 57

145. Decorated Vaulting (14th Century).—A further elaboration of the system of vault ribs marked the development of vaulting in the 14th century, until the surface of the vaults presented a very complicated appearance, although the construction was still very simple. A new set of ribs, lying entirely in the vault soffit and not springing from the piers, now makes its appearance, and short, little ribs extend from the intermediates to the ridge ribs, as at *hj*, *hk*, and *eg*, Fig. 56 (*f*). This is called *lierne vaulting*, and presents the appearance shown in Fig. 54 (*d*).

This progressive elaboration of the vaulting ribs increased until the spaces between the ribs became so small that each could be spanned by a single stone, giving to the system the name of **rib-and-panel vaulting**; while, owing to the

FIG. 58

form of the plan, the designs are frequently termed *stellar vaulting* (see Fig. 57). Stellar and lierne vaulting combined is shown in Fig. 54 (*e*) and in plan in Fig. 56 (*e*), while Fig. 56 (*d*) shows a diagram of the plan of Fig. 57.

146. Perpendicular Vaulting (15th Century).—The development of the plan of the stellar designs of vaulting brought about an entirely different arrangement known as *fan vaulting*. In this style the vault ribs radiate from the top of the pier, or shaft, and spread out fanlike in the form of an inverted cone, as shown in Fig. 58. These spreading

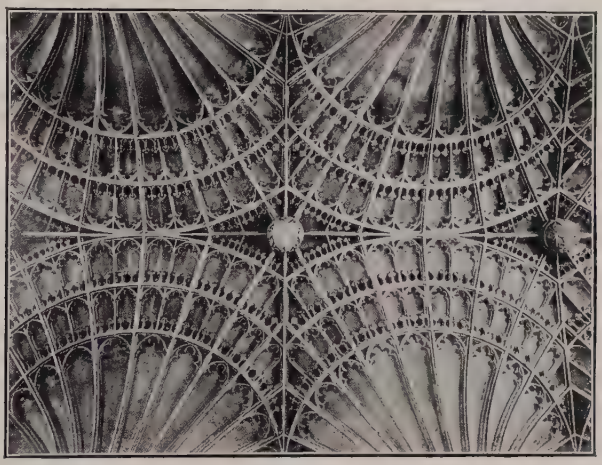


Fig. 59

ribs were connected at intervals by short ribs, and the crown of the vault between these inverted cones became a flat surface to be filled in, as shown in Fig. 54 (*f*) and 56 (*g*).

With this complication in design came a change in construction. The ribs were now so numerous and the spaces between them so small that it seemed useless to consider them separately. Consequently, toward the end of the Perpendicular period the walls were laid up and arched over in jointed masonry, and when the mortar was set and dry the ribs and panels were carved on the face of the vault soffits (see Figs. 59 and 60). The structural character of the ribs

FIG. 60

ceased, and the ribs came into existence purely as ornament —ornament that was unarchitectural, as it asserted itself to be a part of the construction whereas in reality it was not. The ribs no longer had any architectural significance; they were simply decorations on the surface of the vault.

147. Timber Roofs.—As already mentioned, over the vaulted naves of the churches, timber roofs were constructed to protect the structure from the weather, and in other build-

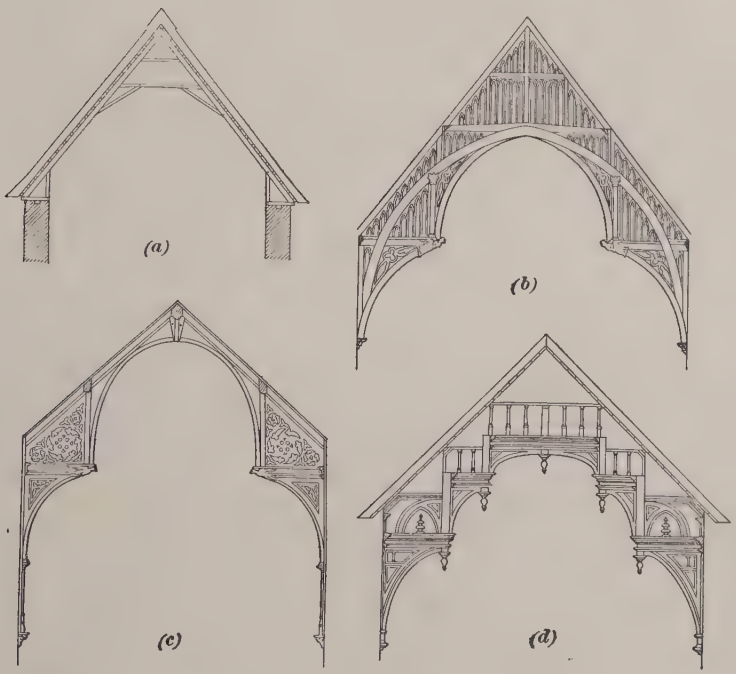


FIG. 61

ings that were not vaulted, these roofs partook of considerable elaboration in construction and variety of design. Open-timber roofs, as they are called, are a characteristic feature of English Gothic architecture and are classified under four heads, according to their construction; namely, *tie-beam*, *trussed-rafter*, *hammer-beam*, and *collar-braced roofs*.

The tie-beam roof consists of two rafters inclined to the proper angle and held together at or near their bearings by a tie-beam across the building. Elaborations of this principle and further complications were introduced by ornamental work being placed above the tie-beam when the pitch was steep.

In the trussed-rafter roof, the low tie-beam is done away with, and braces are used to strengthen the rafter at the top and bottom, as shown in Fig. 61 (*a*). This arrangement permitted the pointed vault to extend well up into the roof construction.

The hammer-beam roof consisted of an arrangement of struts and ties ornamented with curved braces at the angles, all of which were tenoned and pinned together. Fig. 61 (*c*) shows a hammer-beam roof, and at (*d*) is shown a double-hammered beam construction.

The collar-braced roof was a modification of the hammer beam, and consisted of a rafter braced up to the ridge with curved struts, as shown in Fig. 61 (*b*).

The timbers of these wooden constructions were richly carved and elaborated, some of the roofs producing decorative features of great beauty.

EXAMPLES

148. Nearly all of the English cathedrals were commenced in the Norman period, and their construction continued throughout the four centuries of Gothic development. Any one of these structures, therefore, will show in its various parts the characteristics of each individual period.

149. Peterborough Cathedral.—In Fig. 62 (*a*) is shown a transverse section through the nave and aisles of Peterborough Cathedral, which was built during the Norman period. The aisles were vaulted as shown, but the nave was covered only by a wooden roof.

In the nave, as shown in elevation at (*b*), three tiers of arches are supported by the piers, the first *a* opening to

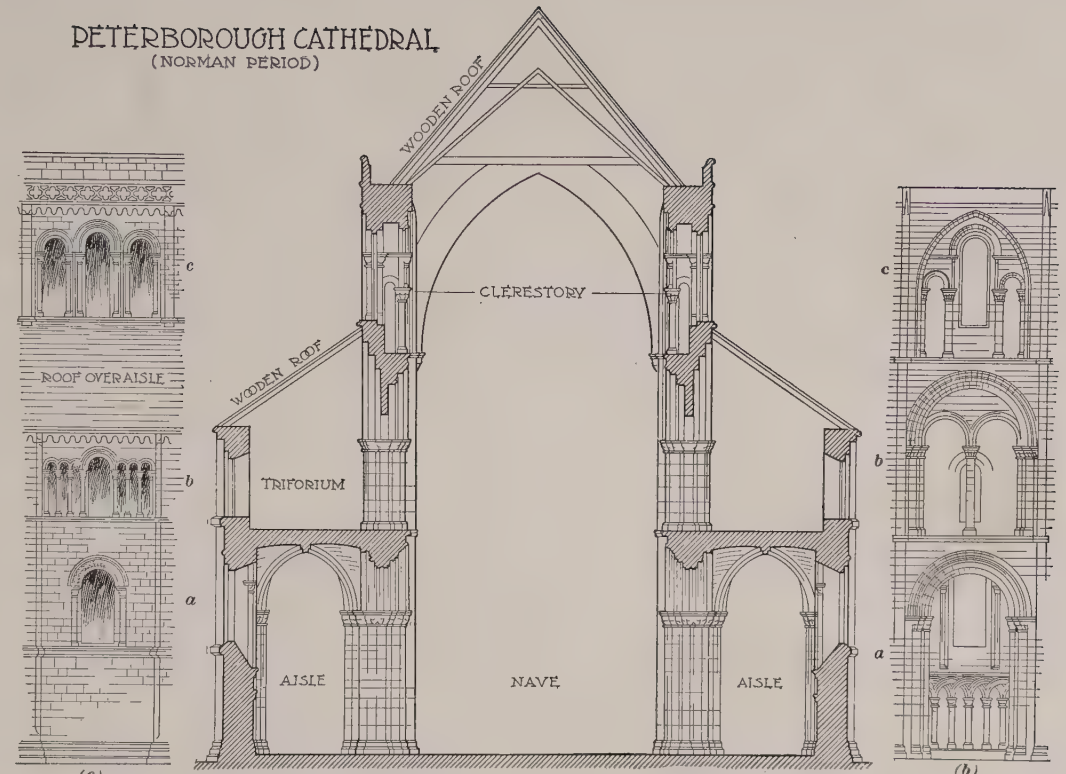

PETERBOROUGH CATHEDRAL
(NORMAN PERIOD)
WOODEN ROOF
CLERESTORY
WOODEN ROOF
TRIFORIUM
AISLE
NAVE
AISLE
ROOF OVER AISLE
c
b
a
c
b
a
(c)
EXTERIOR ELEVATION OF AISLE WALL & CLERESTORY
(a)
SECTION
(b)
INTERIOR ELEVATION OF NAVE WALL

FIG. 62

FIG. 63

the aisle, the next *b* disclosing the triforium, and the third *c* showing the clearstory. These openings are covered by semicircular arches, characteristic of the Norman period, and the details are extremely simple, tending to severity.

On the outside elevation, as shown in (*c*), a single semicircular-headed window *a* in each bay lights the aisle, while a small arcade above *b* pierces the wall of the triforium. Triple windows above at *c*, mark the clearstory. All of these details are extremely simple, and no attempt is made to carve or decorate the capitals or moldings elaborately.

Peterborough Cathedral was begun in 1117, and as a portion of it was completed before the end of the 12th century, it can be taken as a pure example of the Norman period. In Fig. 63 is shown the interior.

150. Salisbury Cathedral.—In Fig. 64 are shown similar sectional views of Salisbury Cathedral, which was built between the years 1220 and 1258 and is therefore entirely Early English in design. The nave as well as the aisle is vaulted, with a pointed arch for the transverse ribs, and the thrust of the nave vault is transmitted to the buttress *b* by a brace *a* in the form of a *flying buttress*. This flying buttress finishes flush with the wooden roof of the aisle and therefore is not observable on the outside of the building. Here then, in the Early English style, is introduced a new architectural detail, the flying buttress, made necessary by the vaulting of the nave but so concealed under the aisle roof that it does not appear as an exterior detail.

In Fig. 64 (*b*) is shown an inside elevation of the nave, wherein pointed arches replace the semicircular arch of the Norman period, and at (*c*) the outside elevation is shown, with the double windows that light the aisle and the triple windows in the clearstory. There are no exterior windows in the triforium here, and the wooden roof over the aisle vaulting extends from the sill of the clearstory windows to the top of the aisle wall. An interior view of the Salisbury Cathedral is shown in Fig. 65.

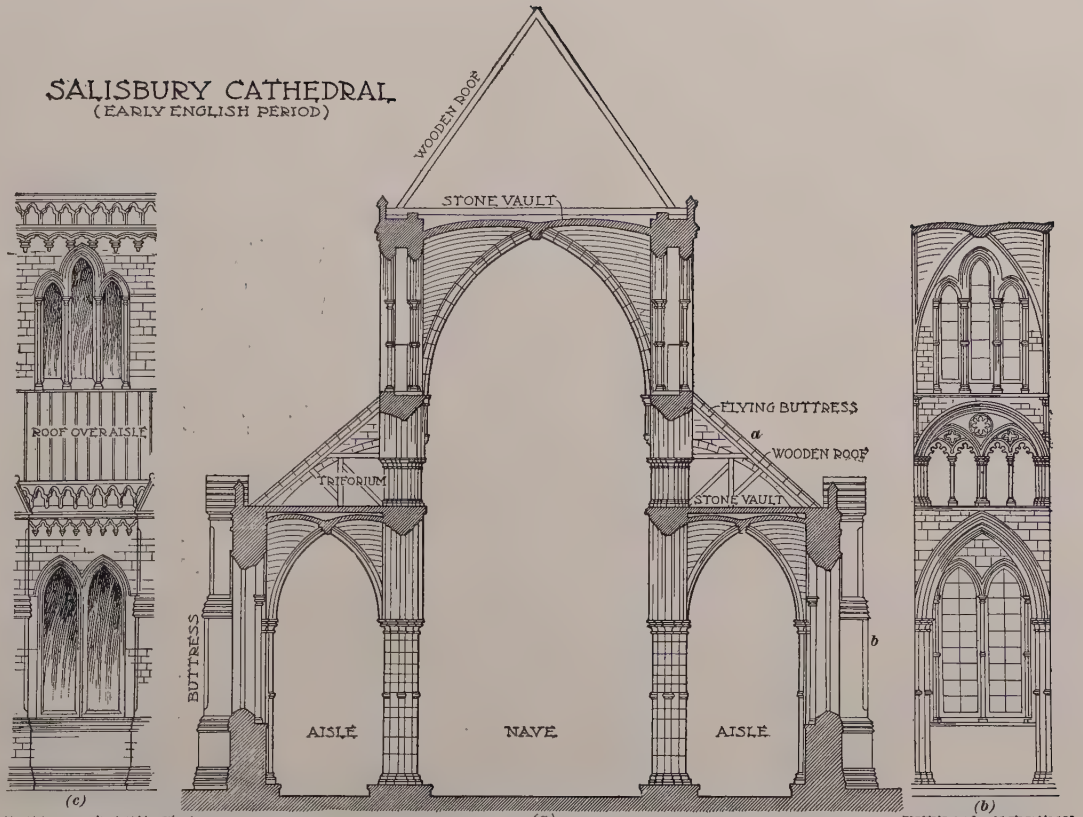

SALISBURY CATHEDRAL
(EARLY ENGLISH PERIOD)
WOODEN ROOF
STONE VAULT
FLYING BUTTRESS
a
WOODEN ROOF
TRIFORIUM
STONE VAULT
ROOF OVER AISLE
BUTTRESS
b
AISLE
NAVE
AISLE
(c)
EXTERIOR ELEVATION OF AISLE WALL & CLERESTORY
(a)
SECTION
(b)
INTERIOR ELEVATION OF NAVE WALL

FIG. 64

253

FIG. 65

151. Lichfield Cathedral.—A transverse section through the Lichfield Cathedral, Fig. 66 (*a*), shows the flying buttresses *a* above the aisle roof, and the buttresses *b* weighted with pinnacles *c* so as to add to their stability. This method of construction is characteristic of the Decorated, or 14th century, period. The additional intermediate ribs in the nave vault are also shown in this figure.

The inside elevation of the nave, at (*b*), shows a triangular window with three *trefoil*, or three-leaved, openings *a* in the clearstory, and a pair of pointed windows *b* in the triforium, and one broad pointed window in the aisle wall. The clearstory and aisle windows are divided by mullions supporting smaller pointed arches that in turn support the stone filling above. This filling is pierced with openings in the form of quatrefoils and trefoils. This method of piercing the wall and thus decorating the upper part of the windows is called tracery, which will be taken up later.

On the outside elevation, at (*c*), the aisle and clearstory windows are shown as within with three foliated piercings under the point of the arch. The buttresses show applied decoration in the form of decorated gables at *b*, as well as actual gables over their tops at *a* and *c*. Thus, it will readily be seen that the tendency of the style is toward elaboration of detail and false structural devices, as opposed to the Early English style, which was characterized by simple detail and sincere construction.

152. Winchester Cathedral.—The characteristics of the 15th century vaulting have already been discussed, but the development of the general construction in the Perpendicular period is well shown in Fig. 67 (*a*), which illustrates a section through the nave of the Winchester Cathedral. Here are clearly shown the ribs of the complex vaulting, and the effect of this system on the shape of the vault. Instead of a high-pointed vault, as over the nave of the Salisbury Cathedral, Fig. 64, the vault was constructed of a series of short arcs lying in a comparatively flat plane. In consequence, the window heads, which took their form from the

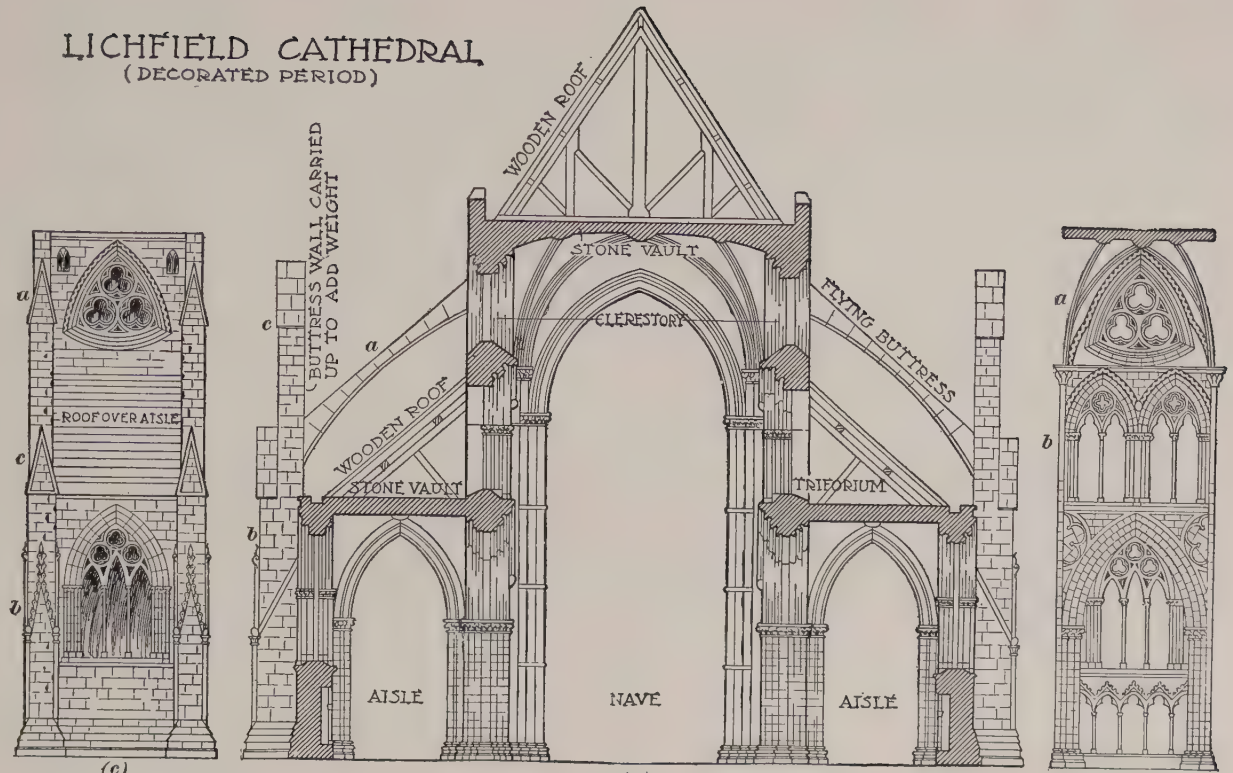

LICHFIELD CATHEDRAL
(DECORATED PERIOD)
WOODEN ROOF
BUTTRESS WALL CARRIED UP TO ADD WEIGHT
STONE VAULT
CLERESTORY
FLYING BUTTRESS
WOODEN ROOF
STONE VAULT
TRIFORIUM
AISLE
NAVE
AISLE
ROOF OVER AISLE
a
b
c
(c)
EXTERIOR ELEVATION OF AISLE WALL & CLERESTORY
(a)
SECTION
(b)
INTERIOR ELEVATION OF NAVE WALL

FIG. 66

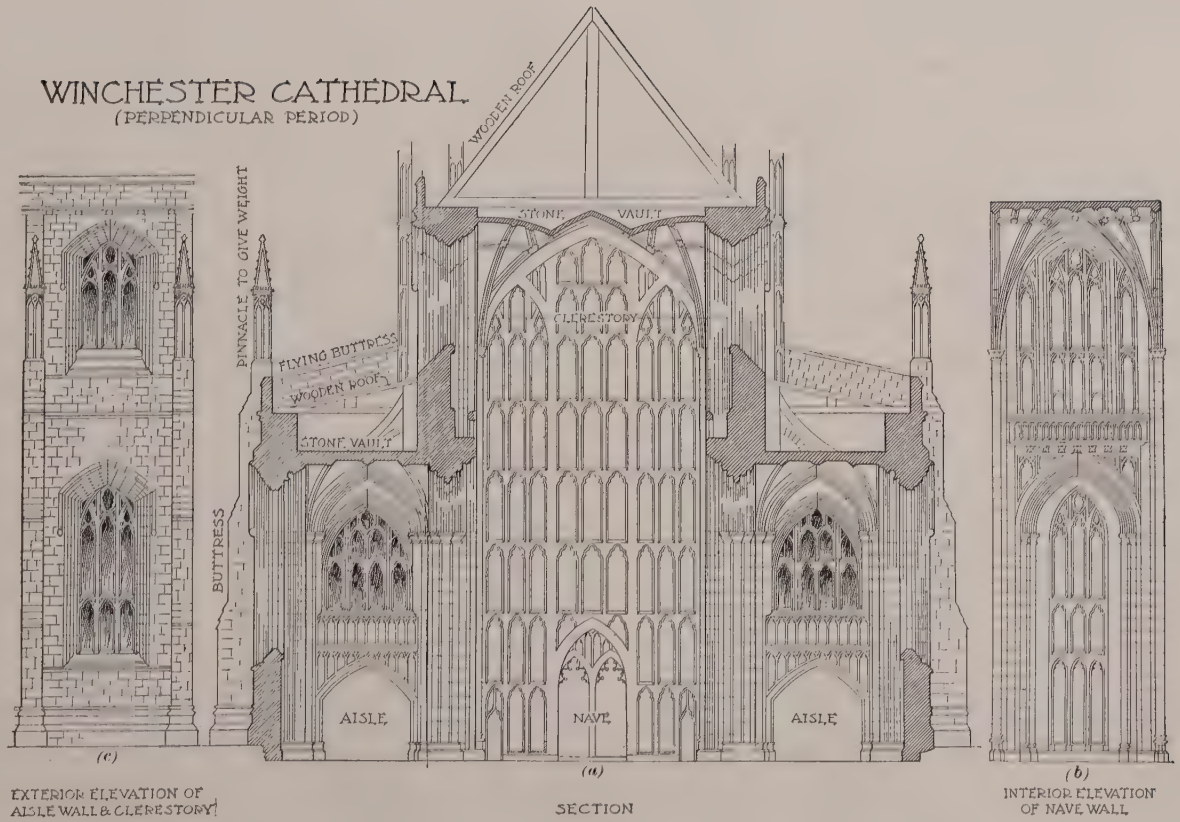

WINCHESTER CATHEDRAL
(PERPENDICULAR PERIOD)
WOODEN ROOF
STONE VAULT
CLERESTORY
PINNACLE TO GIVE WEIGHT
FLYING BUTTRESS
WOODEN ROOF
STONE VAULT
BUTTRESS
AISLE
NAVE
AISLE
(c)
(a)
(b)
EXTERIOR ELEVATION OF AISLE WALL & CLERESTORY
SECTION
INTERIOR ELEVATION OF NAVE WALL

FIG. 67

vault, also become flattened and the pointed arch under which pairs and triplets are grouped, then assumed a low, broad, and squat-like contour that was struck from four centers. All groupings tended to a multiplication of perpendicular lines; consequently, the window openings were arranged to present the grouping of a lot of perpendicular panes with elaborate tracery at the top.

The interior elevation of the nave, at (*b*), shows the depressed, or drop, arch in the nave arcade, with elaborate panelwork and decoration carved about it. The clearstory windows consist of a group of three nearly rectangular openings, the tops of which are given a pointed effect by means of tracery. The structural significance of the pointed arch is now lost entirely, but as the style declines the form is still used for decorative purposes, regardless of its propriety or form.

On the exterior of this cathedral, as shown at (*c*), the effect of the change is even more apparent. Windows grouped under a depressed arch are protected by a similarly formed dripstone. Vertical mullions divide the window from sill to head, while traceried forms convert the tops of the individual openings into the lancet forms of traditional Gothic. The pinnacles used to weight the buttresses are elaborately carved in vertical panels and are crowned with pyramidal roofs and foliated decorations. The flying buttresses are low, and, with the aisle roof, are hidden behind the parapet of the outside aisle wall.

153. The four periods of the English Gothic style have been considered separately, but it must not be overlooked that these four periods form one continuous style and that the change from one period to the next was slow and transitional, usually covering a period of about 50 years. Moreover, the changes took place at different times in different parts of the country, as the general development, though progressive, was slower in some sections than in others.

154. Church at Iffley.—The little Norman Church at Iffley, Fig. 68, was erected sometime in the 12th century,

FIG. 68

FIG. 69

Fig. 70

and is one of the most interesting examples of the Norman style, not because of its importance architecturally or historically, but because it has been preserved with so few changes. This church is 103 feet long and 19 feet wide, inside measurements. There are three entrances, one on each side (north and south) and one in the west end. Each entrance is elaborately decorated and the design of each is different, the west one being the most ornate.

155. Canterbury Cathedral.—Canterbury Cathedral, Fig. 69, is a splendid structure, being 545 feet long and 170 feet wide with a nave 80 feet high. Nearly four centuries passed while this structure was being erected, and it thus presents nearly every period of the English Gothic style. It was commenced in the 12th century on the site of an older structure built during the Roman occupation, and the great bell tower at the crossing of the nave and transept was finished in the Perpendicular period, about the close of the 15th century.

156. Ely Cathedral.—Ely Cathedral, Fig. 70, is one of the longest cathedrals in Europe, its external length being 537 feet. Like Canterbury Cathedral, it presents examples of each period of English Gothic, as it was commenced in 1081, the eastern portion completed in 1106, and additions and alterations made up to the 16th century. The octagonal tower at the crossing is one of the most striking designs to be found in the style.

157. Wells Cathedral.—Wells Cathedral, Fig. 71, is one of the smallest, but at the same time, most beautiful, cathedrals of England. The front is beautifully ornamented and consists of niches that contain over three hundred sculptured figures, half of which are either life size or larger.

The interior of this structure, Fig. 72, is rich and impressive. The sun streaming through the colored glass of the east windows bathes the interior in a polychromic glory, with which the interlacing arches, the sharp-cut foliage carved on the capitals, and the lofty, ribbed vaulting blend most harmoniously.

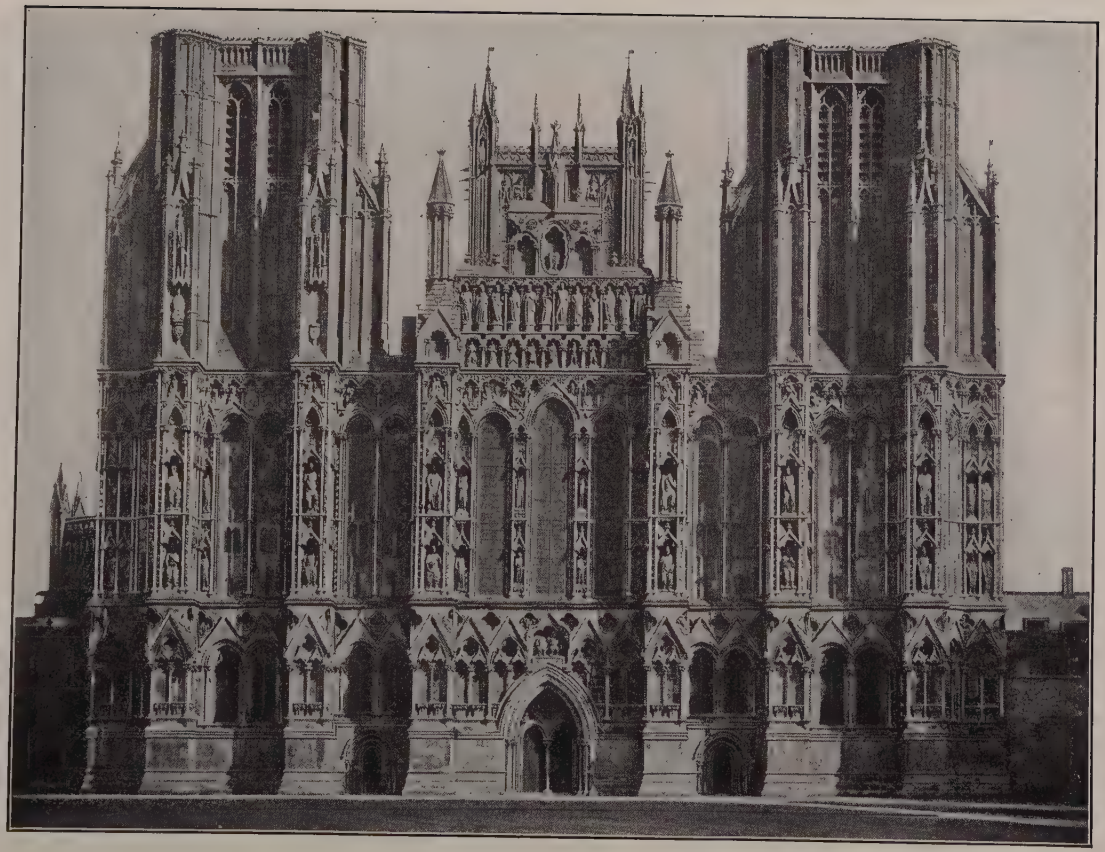


FIG. 71

263 FIG. 72

FIG. 73

158. Westminster Abbey.—Westminster Abbey, Figs. 73 and 74, was founded in the 11th century by the

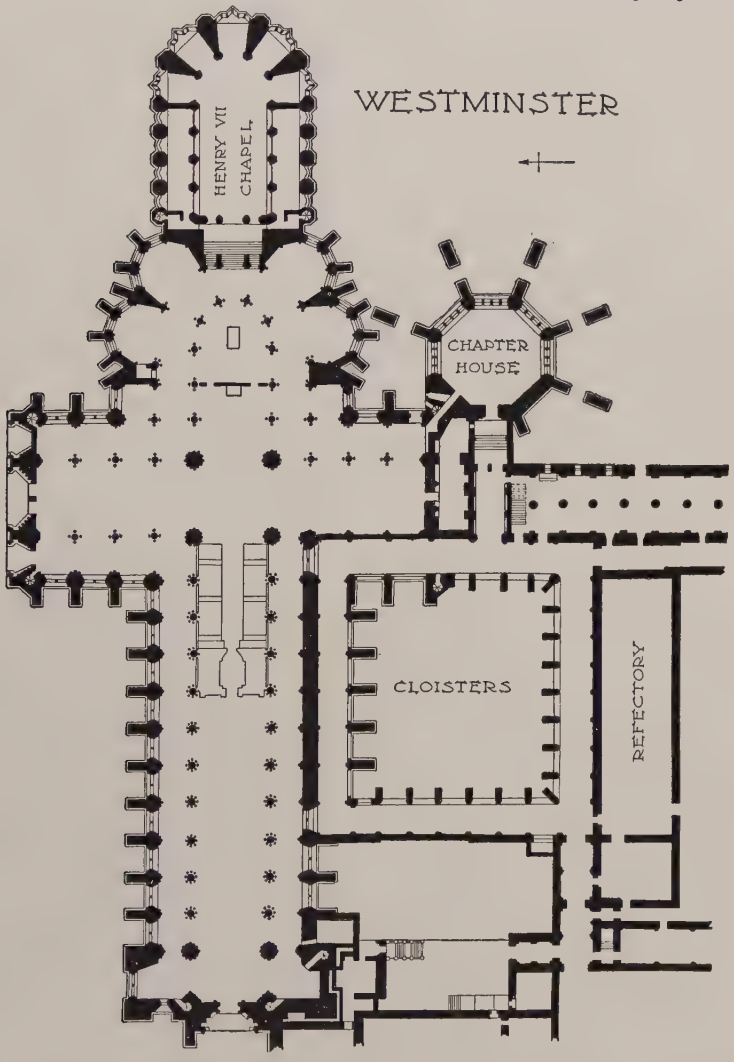


FIG. 74

Dominican monks, commonly known as the Black Friars, on account of their costume. Like other monasteries, it

consisted of a cloister court, from which opened the chapter house. The cloisters were vaulted passageways between different parts of the monastery, and the chapter house was a building, usually octagonal in England, set apart for the business meetings of the abbot and canons of the Church. On one side of the court extended the refectory, or great dining hall, while the dean's house and garden occupied another side. In addition to the details shown in Westminster plan, Fig. 74, the monasteries usually possessed an inner court with an infirmary for the sick and aged, a guest house, a kitchen, a servants' hall, a library, and a scriptorium, or room for the copying and illuminating of books. A court with a gateway for carts was usually surrounded by granaries, bakehouses, storerooms, stables, servants' quarters, etc., and mills, workshops, gardens, orchards, etc. were distributed as circumstances required. Monasteries took the place of inns during the medieval period, and even at the present day there are parts of Europe where they still fill this function.

ANALYTICAL STUDY

PLANS

159. During the Norman period, the cathedral and church plans usually consisted of a Latin cross with a tower at the intersection of the arms, an altar in the short arm, and a choir extending from the transept toward the east as in the Peterborough Cathedral, Fig. 75. The Early English plans varied only slightly from the Norman, but the introduction of the new vault had a tendency to alter the planning, as the compartments of the nave became oblong instead of square. Double transepts are introduced into some of the plans of this period, as in the Salisbury Cathedral, Fig. 75.

The plans of the Decorated period introduce wider spacings in the bays, except in cathedrals started during the earlier periods, as in the York Cathedral, Fig. 76. The

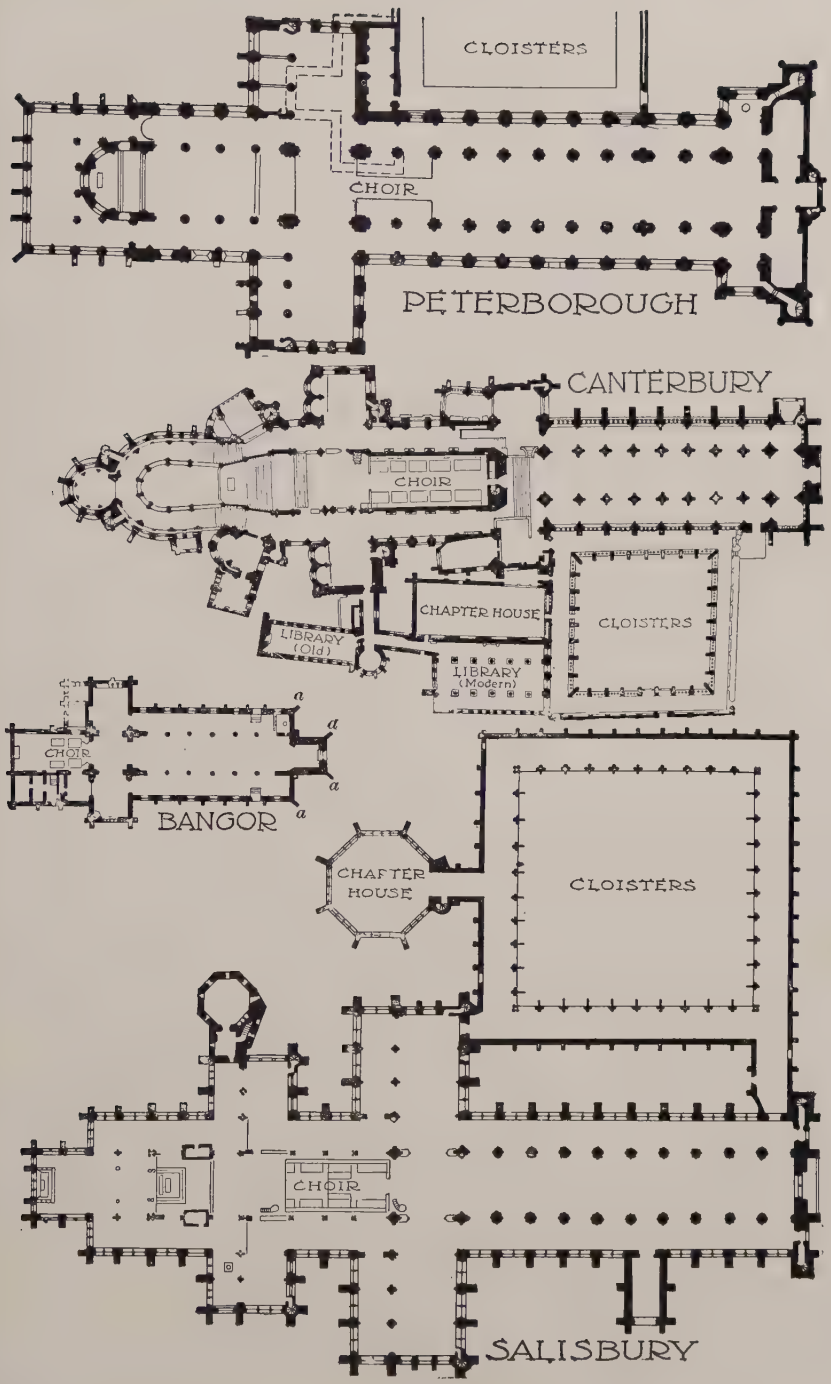

CLOISTERS
CHOIR
PETERBOROUGH
CANTERBURY
CHOIR
CHAPTER HOUSE
CLOISTERS
LIBRARY (Old)
LIBRARY (Modern)
CHOIR
a
a
a
a
BANGOR
CHAPTER HOUSE
CLOISTERS
CHOIR
SALISBURY

FIG. 75

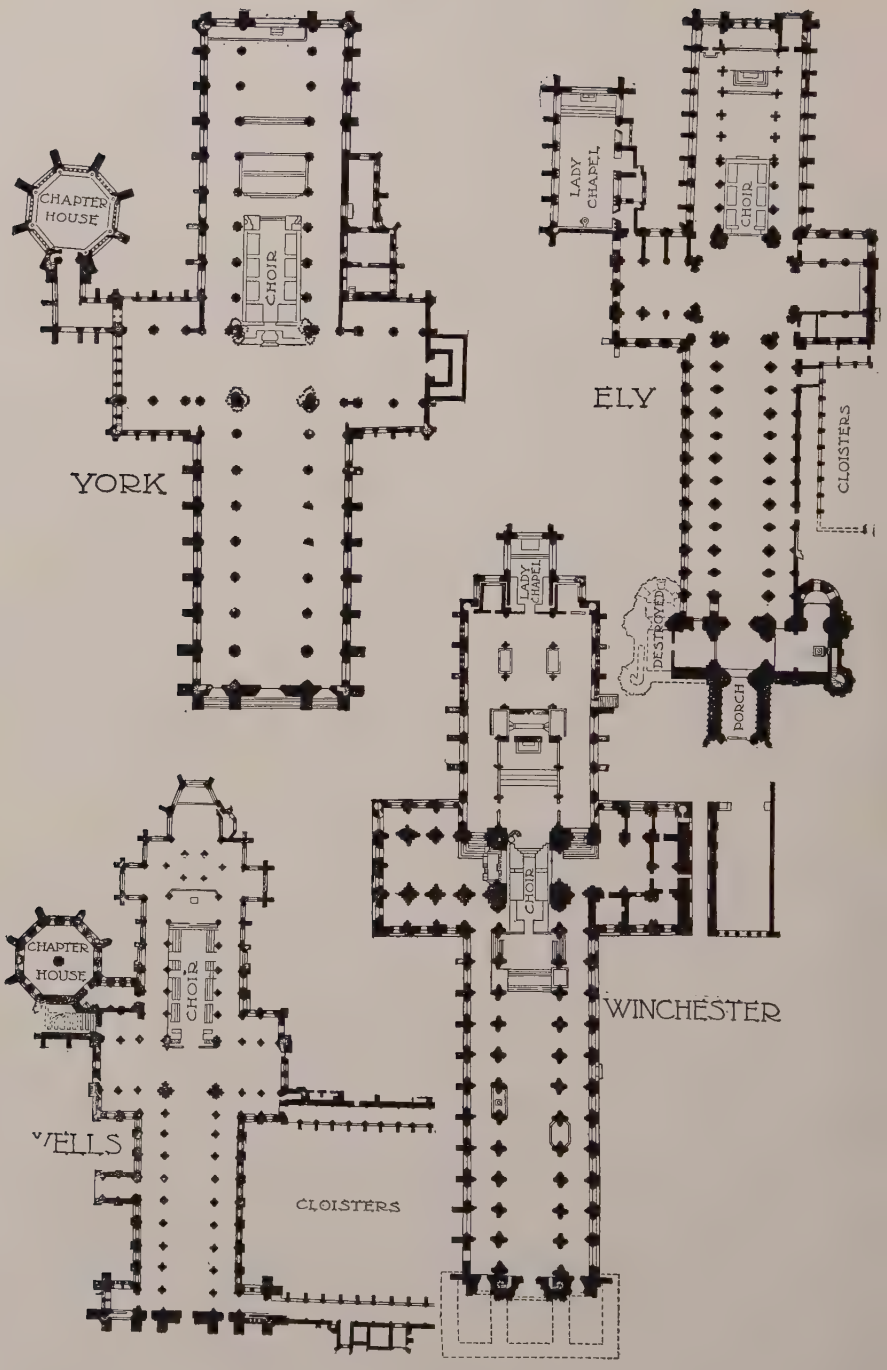

CHAPTER HOUSE
CHOIR
YORK
LADY CHAPEL
CHOIR
ELY
CLOISTERS
LADY CHAPEL
DESTROYED
PORCH
CHOIR
WINCHESTER
CHAPTER HOUSE
CHOIR
WELLS
CLOISTERS

FIG. 76

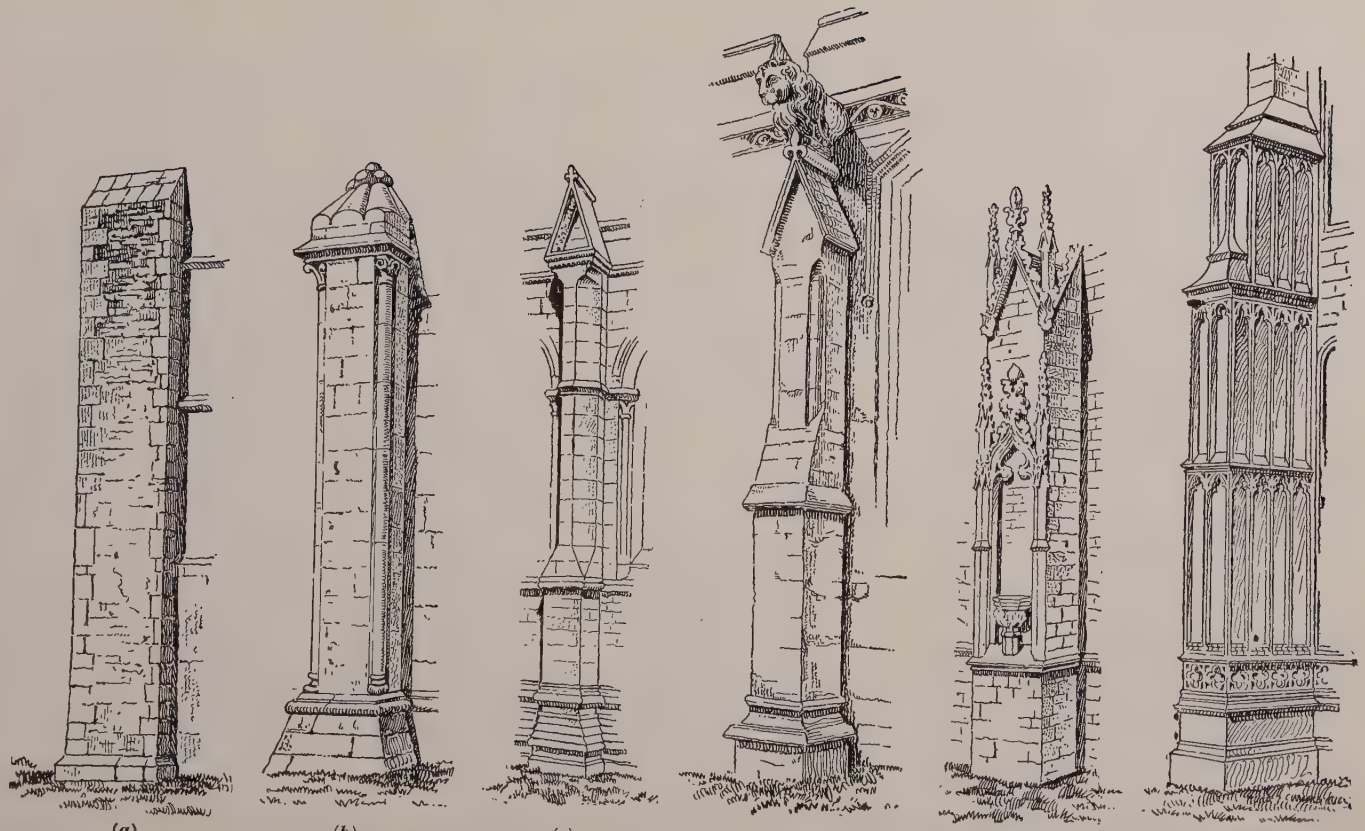
progress of vaulting influenced the setting out of the piers, and the vaults themselves became influenced by the introduction of stained glass in the windows, thereby demanding much larger windows. The central towers were carried higher and surmounted the spires, which were usually octagonal and carried exterior ribs on the angles. This was a period of parish churches and domestic architecture more than of cathedrals, as the latter had nearly all been started in the earlier periods.

During the Perpendicular period, the system of planning had not changed. The great building activity during the previous periods rendered numerous new structures unnecessary, and the ecclesiastical work consisted mostly of additions and repairs. The piers became somewhat smaller and the buttresses much deeper, as the latter were called on to carry more of the weights and pressures.

WALLS

160. During the Norman period, the walls were very thick, owing to the use of the semicircular arch, and the inside walls were usually divided about evenly between the arcade and the triforium and clearstory, as shown in the Peterborough Cathedral, Fig. 62. The buttresses were broad and flat, projecting little beyond the wall itself, and, frequently, they did not project beyond the corbel table at the bottom, see Fig. 77 (*a*). The stonework was inferior, the core being poorly bonded with the facing, and, consequently, in many instances failed.

During the Early English period, more cut stone was employed, and it was carried deeper in the rubble filling, although the walls retained the same massiveness as in the Norman style. The adoption of the pointed vault and consequent concentration of the weight of the roof vaults on the buttresses, gradually reduced the thickness of the enclosing walls between the supports, so that they became merely screens between the buttresses. The buttresses themselves were necessarily thicker, as they carried the entire weight of



(a) (b) (c) (d) (e) (f)

FIG. 77

the vault, frequently attaining a projection equal to their width. See Fig. 77 (*b*). In order to resist the horizontal thrust that was occasioned by the pointed-roof vault, the outer faces of the buttresses were gradually set back by slanting, weathered offsets, so that the buttresses were smaller at the top where less strength was needed. The corners were sometimes chamfered, Fig. 77 (*c*) and (*d*), and, occasionally, where the offsets occurred, a small gable was introduced. During this period the flying buttress appeared, but it was concealed under the aisle roof and did not form a prominent feature until later. The subdivision of the interior walls along the nave usually gave one half to the arcade, and the other half was evenly divided between the triforium and the clearstory. See Fig. 64.

161. In the Decorated period, the walls themselves received a decorative treatment in the form of paneling. The development of tracery in the windows and the increased size of the buttresses, with the paneling of the wall between them, were characteristic of this period. The buttresses themselves were offset, as in the previous period, and are frequently ornamented with niches, as in Fig. 77 (*e*), or occasionally with canopies and crockets. Buttresses at the angles of the buildings, projecting diagonally, were introduced in this period, as shown at *a* in the Bangor Cathedral, Fig. 75. The parapets were pierced with geometrical designs and flowing tracery, although the battlemented form was strongly adhered to.

With the Perpendicular period, the walls became profusely paneled, strongly resembling the tracery of the windows. The parapets were embattled as before and also paneled and frequently were richly designed. The buttresses were much deeper than in the previous period, sufficient, sometimes, to permit their being screened off and forming a separate chapel. The buttresses were elaborately paneled on their faces, as in Fig. 76 (*f*), and often they were mounted with finials or ornamented with crockets. Flying buttresses were more common and had much larger span.

COLUMNS

162. An interesting development of the arcades under the nave walls of the cathedrals is shown in Fig. 78. The change of form from the round arch to the pointed arch, which has been previously discussed, resulted in a change from the heavy pier to the lighter pier, while the elaboration of carving from the simple tooth ornament to the foliated forms of the Gothic period was due to change of taste, increase of skill, and improvement of instruments used. The two arches shown in Fig. 78 (*a*) illustrate the change in carving. The arch on the left shows the Norman crude work which was cut with the stone ax, while that on the right shows the transition in style and elaboration in design, when the chisel supplanted the ax, at the close of the 12th century. The example here shown is taken from the Canterbury Cathedral, and is a striking example of advancement and style.

In Fig. 78 (*b*) is shown the characteristic Norman column with the pointed Norman arch and carved ornament, introducing nothing but the pure Norman moldings. In (*c*) is shown the heavy, round column carved to represent a cluster of columns, but the capitals are simply a group of the smaller details shown in (*b*), and the arched moldings are still Norman in character.

The Early English treatment is shown in (*d*). Here, the arches are pointed and the columns are clustered and capped with the characteristic stiff-leaf foliage. The moldings of the arches contain the dog-tooth ornament characteristic of this period, while the walls themselves retain that sturdy thickness and body inherited from the Norman style. In (*e*), the columns become lighter, the arches more pointed, the details more delicate, and the walls much thinner. The surfaces over the arches are richly diapered, and intermediate bands surround the columns, apparently tying the strands together.

In (*f*), approaching the Decorative period, the capitals are ornamented with elaborate leaf carvings, and the spandrels between the arches present elaborated canopies *a* with gables

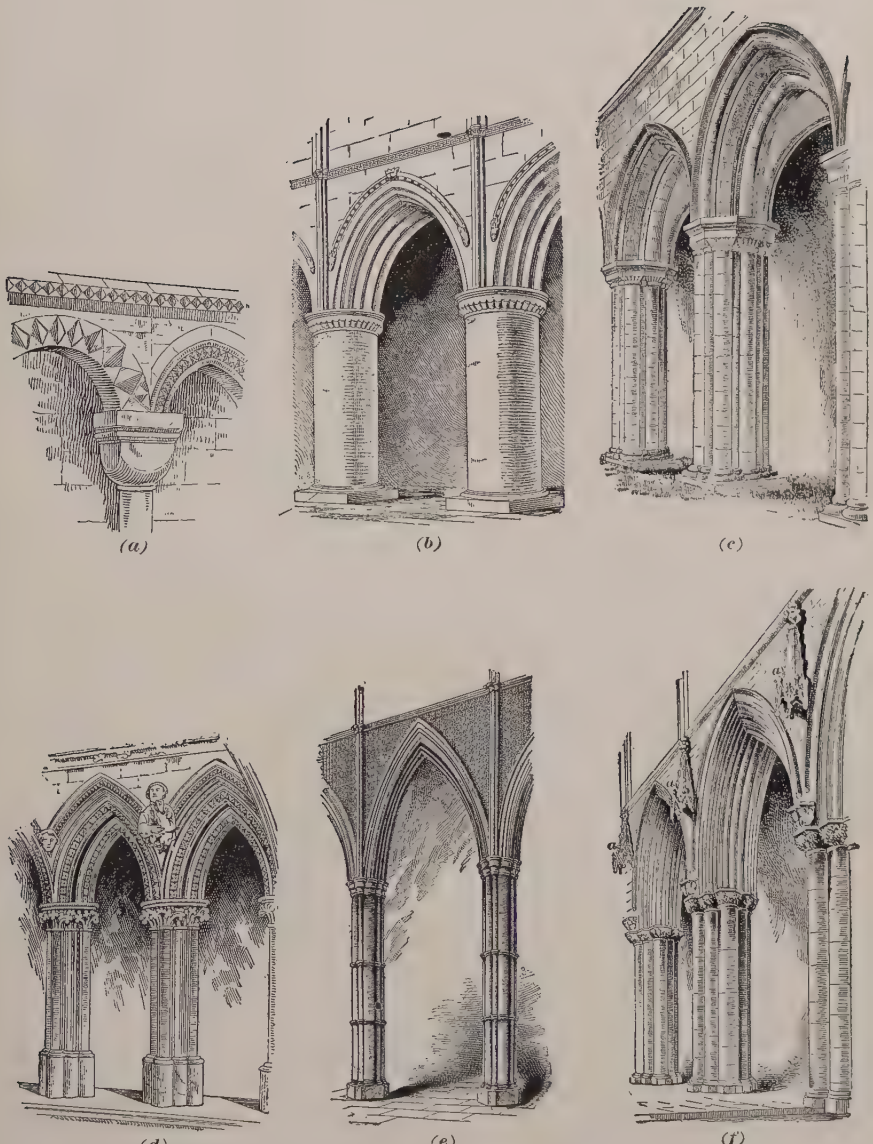


FIG. 78

FIG. 79

and finials. There was no marked change in the treatment of the arches in the Perpendicular period, as few alterations were made at this time in the naves of cathedrals that demanded such changing.

163. The earliest column capital in the Norman period was simply a block with its lower corners rounded off to make the rounded side conform to the round column that supported it, as shown in Fig. 79 (*a*). Later, the square capital became carved, as in (*b*), and the supporting details were indented so as to represent leafwork. This change in form introduced the molded capital shown in (*c*), in which the hollow support was retained uncarved, while the abacus was turned in a series of circular moldings. The introduction of foliated work under the capital is shown in (*d*) and (*e*), which, with the example from the Lincoln Cathedral shown at (*f*), present excellent examples of the stiff-leaf foliage characteristic of this period. This is also presented in a similar form in (*g*), which is also from the Lincoln Cathedral. It will be noticed in each of these examples that the foliated form rises from the neck of the shaft, apparently growing out of the same, very much in the same manner as some of the papyrus and lotus-bud capitals. All of these foliated capitals have a bell shape, and the stems of the foliage are apparently retained with a necking at the bottom. In the Decorated period, however, this characteristic was lost, and the leaf ornament seems to be spreading over the surface without growing from it, as shown in (*h*). The bell capital was sometimes used in connection with the ball-flower ornament during this period, but the usual style was one rich in foliage carved meaninglessly on the surface. The leaves of this period are not conventional representations, as in the Early English period, but are portrayals of the characteristics of certain growths, such as the oak, the ivy, the maple, etc.

In the Perpendicular period, the capitals became plain again. They were frequently octagonal in plan, with simple moldings worked around the angles, as in (*i*), or later with the sides carved in some simple leaf form, as in (*j*).

OPENINGS

164. Windows.—One of the strongest characteristics of the English Gothic style, from the late Norman to the Perpendicular period, was the development of tracery. The Norman windows were rather long and narrow, sometimes divided by a shaft, and frequently ornamented with zigzag ornament, as at Iffley, Fig. 80 (*a*). As the style developed toward the Early English, the jambs were molded, and the upper part between the pointed windows was pierced either with a circular opening, as in Fig. 80 (*b*), or with an opening composed of a series of intersecting circles in the form of a trefoil or quatrefoil, as in (*c*).

This decoration of the window subdivision was called **tracery.** Where it consisted simply of piercing the walls with an opening, as at (*b*) and (*c*), it was called *plate tracery*, and where the decorative effect was obtained by carrying these mullions, or bars, to the top of the window head, where they split and intersected, as in (*d*), the system was called *bar tracery*. This bar tracery subsequently became foliated so as to present the introduction of a trefoil both at the heads of the windows themselves and at the openings over the windows, as in (*e*). This foliation indicates approach toward the Decorated period, and in (*f*) is shown a window where this effect has been carried out systematically.

165. During the Decorated period, however, the windows presented a less structural character. The bars did not rise evenly and naturally to the top of the window head and form patterns by their intersections, but finished abruptly, in some cases, in three or four long, narrow lights, over which geometrical constructions filled the window head, as in (*g*), or terminated in wheel forms, as in (*h*). Where the bars split, the subdivisions took a wavy form and a geometrical construction was introduced, as shown in (*i*). This was frequently applied in square openings, as in (*j*). Toward the end of this period the introduction of the ball-flower ornament, Fig. 84 (*q*), as a decorative detail on the moldings rendered

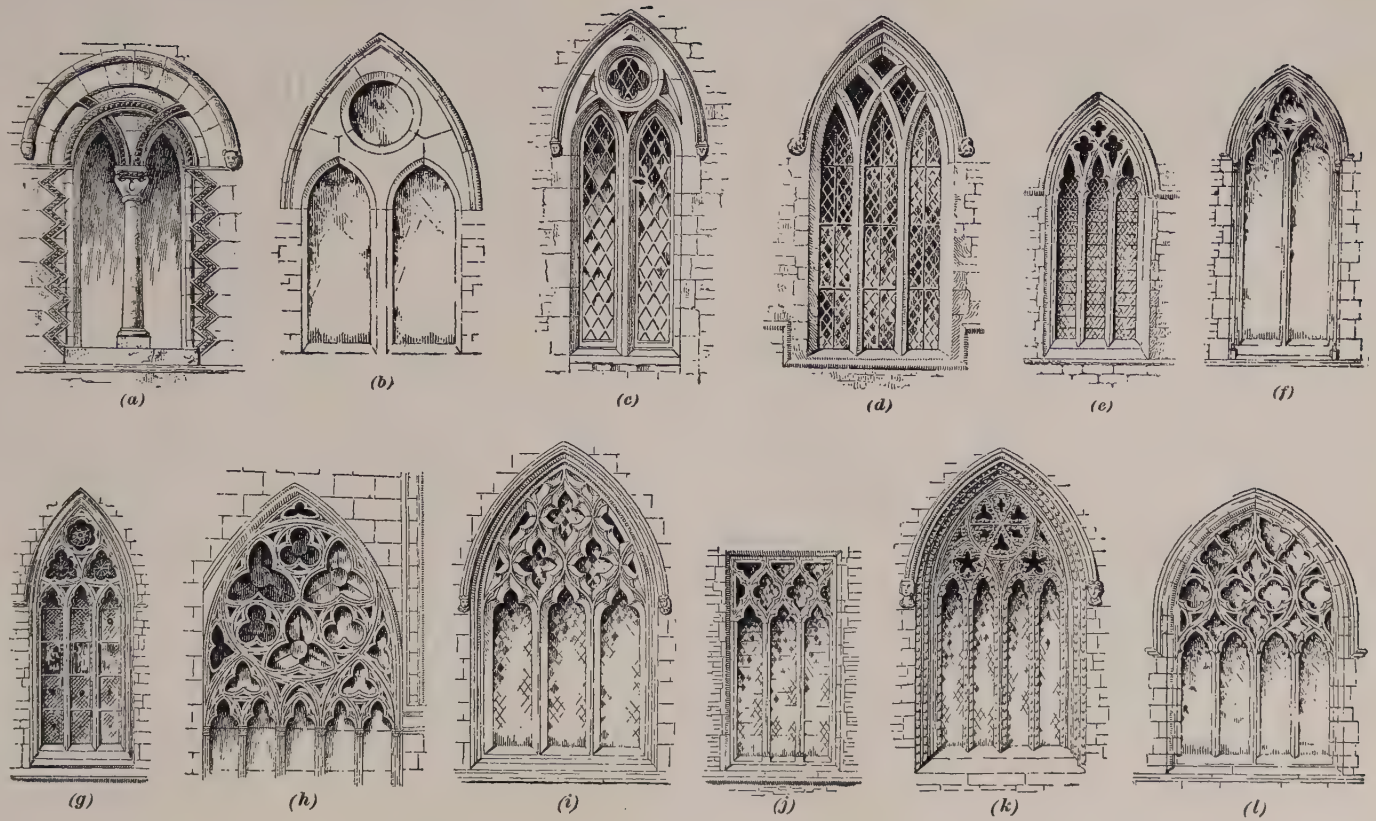


FIG. 80

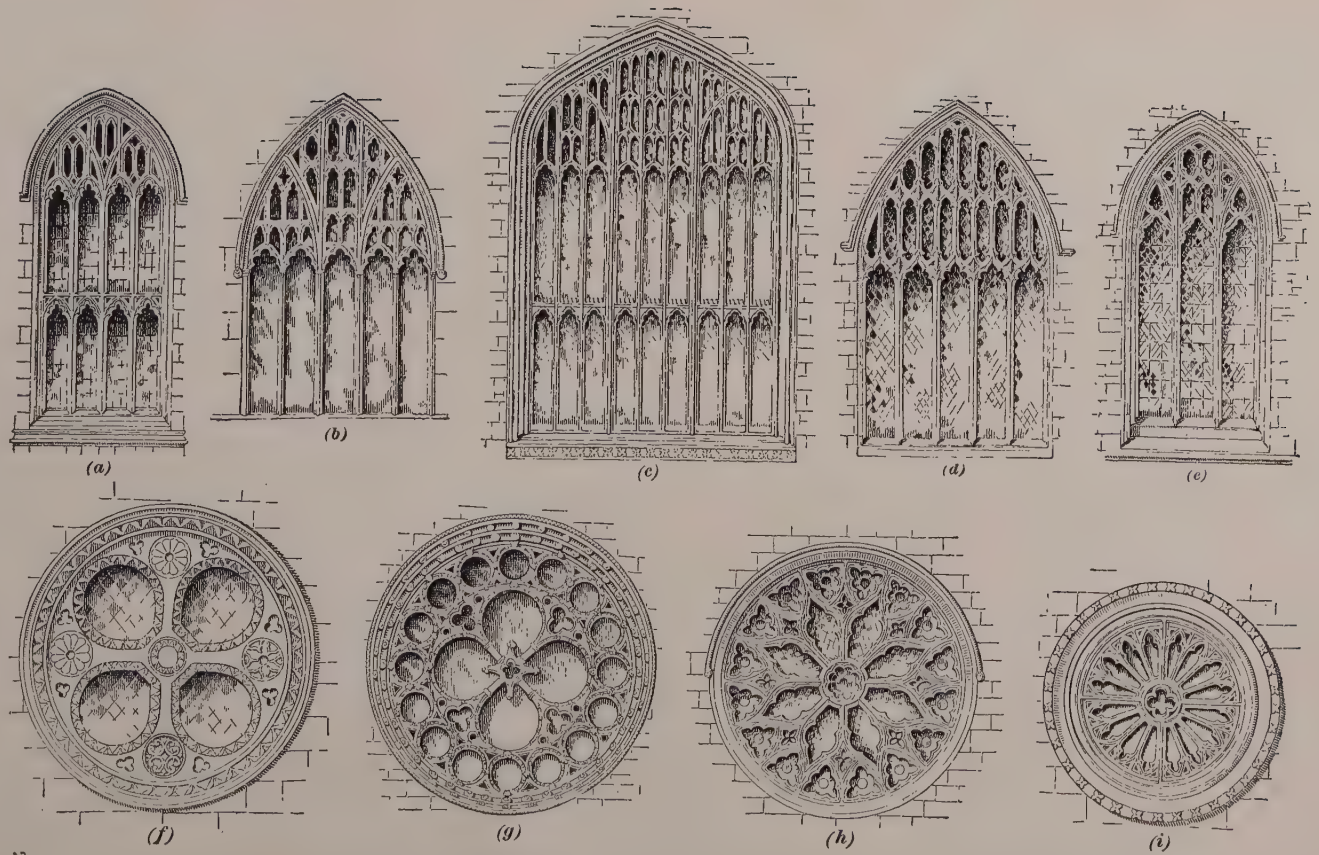


FIG. 81

some of the windows very elaborate, but at the same time detracted from their simple beauty, as in (*k*). The curvilinear tracery shown in (*i*) was frequently carried to greater extremes, as shown in (*l*), making the window appear broader and introducing an even number of panels in the lower half, subject to decorative effects in stained glass.

166. In the Perpendicular period, the tendency to divide the window into two portions—the upper half geometrical in construction, and the lower half narrow in the panels—

FIG. 82

became more emphasized by dividing the lower half into two series of panels, as shown in Fig. 81 (*a*), and carrying the details of the upper portion out in a similar series of panels interspersed with intersecting split bars. Occasionally, where there was an even number of panels, these bars split at the center and continued to the window head in a simple curve with vertical subdivisions between, as in (*a*), or, particularly where there was an odd number of panels, they were carried

straight to the window head, as in (*b*), and the side lights only framed under a curved rib.

The advancement in the system of vaulting, depressing the arches of vault surfaces, required that the window heads should be crowned by a flattened arch in order to correspond with the vault surfaces on the inside. Thus, in Fig. 81 (*c*) there is an extension of the principle shown in (*b*)—a wider window and a depressed vault. In (*d*) is shown a window where the tracery has degenerated into a series of vertical panels, and in (*e*), a window similar in design to that in (*b*), but with longer panels and more tracery in the head.

Fig. 82 shows one end of St. George's Chapel, Windsor Castle, in which the perpendicular treatment of the entire end of the building includes a series of panels of window tracery.

167. Circular windows were introduced at the ends of the naves in the late Norman and Early English periods. The window shown in Fig. 81 (*f*) is strongly characteristic of Norman, and shows the application of the tooth ornament. In (*g*) is shown a window from Lincoln Cathedral that was designed about the same period as that shown in (*f*), and, though still retaining Norman details, it indicates a leaning toward the Early English principles. The Decorated period, however, comes out strongly in its circular windows with foliated openings, as in (*h*). In some cases, there is a wheel construction as at (*i*). These circular windows are usually termed *rose windows*.

168. Doorways.—The Norman doorway was at first a simple arched opening with quoined stones on each side, as shown in Fig. 83 (*a*), but later it was recessed and elaborately ornamented on the jambs, as may be seen in Iffley Church, Fig. 68, and in Fig. 83 (*b*). The simpler form of doorway in the Early English period is shown in (*c*). This doorway is simply a square head with shoulders, but with the development of the period appears the pointed arch characteristic of the style, the recessed jambs with moldings and columns, and the decorative treatment shown in (*d*).

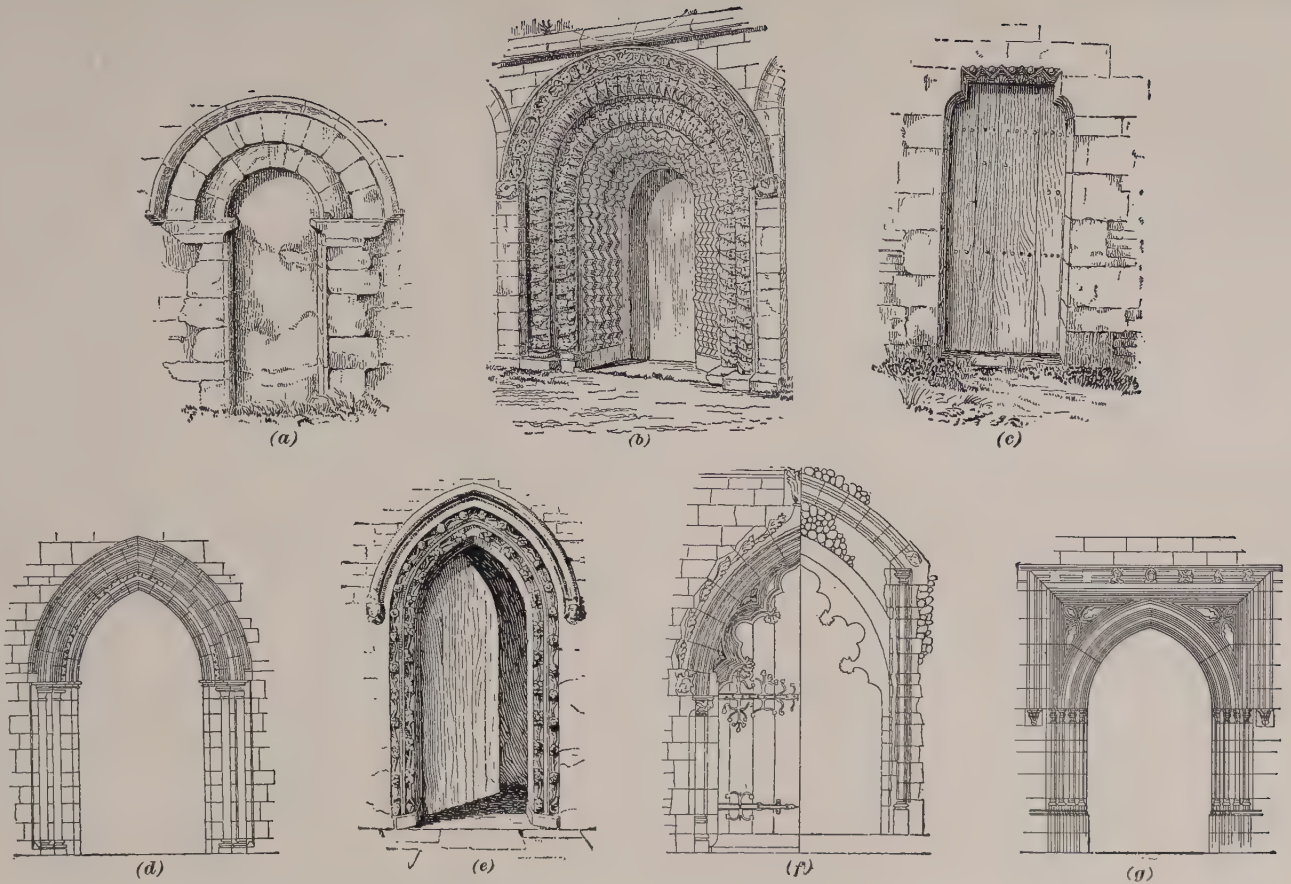


Fig. 83

During the Decorated period, simpler doors presented fewer moldings, but had elaborate decorative effects on the moldings, as shown in (*e*). The dripstone over the door head frequently rested on two carved heads, usually those of the king and the bishop or of two prominent ecclesiastical officers. The tops of the openings during this period were sometimes foliated as in (*f*), the capitals of the columns and the jambs were carved with leaf ornaments, and occasionally a series of crockets was worked over the dripstone.

Perpendicular doorways were frequently square openings within which a pointed arch was struck. Over all a square lintel and a drip were executed, and the spandrels were filled with tracery, as in (*g*). The jambs were decorated with a series of columns, and the general contour formed a simple splay.

MOLDINGS

169. In the earliest Norman construction, the moldings simply consisted of a series of projected courses of stone, as shown in Fig. 84 (*a*). The corners of alternating courses were sometimes chamfered off and a roll carved on the course between, but with the introduction of the pointed arch it became the pointed roll, or *boltel*, as in (*b*).

The Early English moldings consisted of bold, round boltels with deep-cut hollows, producing strong effects of light and shade. They were carved on the same projecting courses as in the Norman, as shown in Fig. 84 (*c*), but presented a greater variety in appearance.

In the Decorative period, the moldings, as shown in (*d*), were not cut so deeply, though they were based on the same details as in the preceding style. In the Perpendicular period, instead of being cut on the projected courses of the masonry work, the surfaces on which they were cut seem to have been reduced simply to plain surfaces, and the lines of the moldings sunk beneath it, as shown in (*e*). The decorative characteristics of the moldings from the Norman period are shown in Fig. 84 from (*f*) to (*s*).

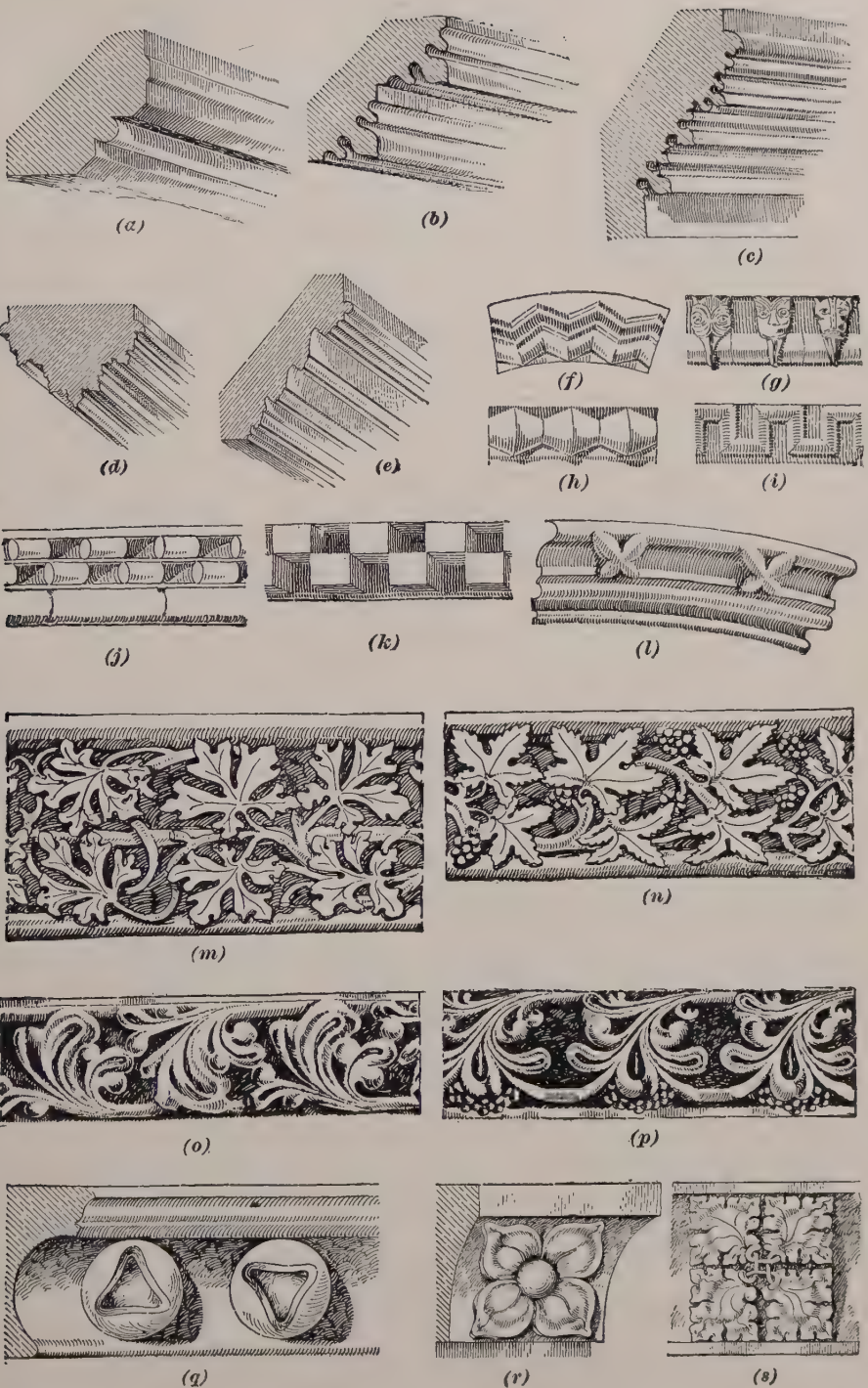


FIG. 84

ORNAMENT

170. The points of gables were frequently ornamented with some form of the cross. In the Norman period, a simple, equal-armed cross usually completed the roof ends. This cross took the form shown in Fig. 85 (*a*) during the Early English period, and was elaborated to the form shown in (*b*) in the Decorated period. The Perpendicular period presented further elaborations, as shown in (*c*).

Finials instead of crosses were sometimes introduced over gables and at the top of buttresses or other lofty points. The form shown at (*d*) is from the Early English period; that at (*e*), from the Decorated period; and that at (*f*), from the Perpendicular period. These are not the only forms that were used to present the general characteristics that prevailed. A simple, stiff-leaf decoration is characteristic of the Early English period, while a profusion of elaboration is characteristic of the Decorated period. A thoroughly stiff and conventional rendering of the Perpendicular period came with the introduction of the double-ogee, or Tudor, arch.

171. Where the groined ribs intersected under the vaults, or where they rested against the side-wall buttresses without a column, it was customary to decorate the point with a bunch of ornamentation usually termed a *boss*. In the example shown in Fig. 85 (*g*), the characteristic details of the Early English foliage can be recognized, whereas the direct imitation of the ivy leaf in the example shown in (*h*) suggests the late Decorative period, and the form shown in (*j*) may be found in the late examples of the Perpendicular period.

Along the gables, as has already been pointed out, crockets were frequently carved. These usually took the form shown at (*j*) in the Early English period, at (*k*) in the Decorative period, and at (*l*) in the Perpendicular period.

172. The battlements which surmounted the walls in the Early English period were simple, square indentations, as shown in Fig. 86 (*a*) and (*b*), but during the Decorative

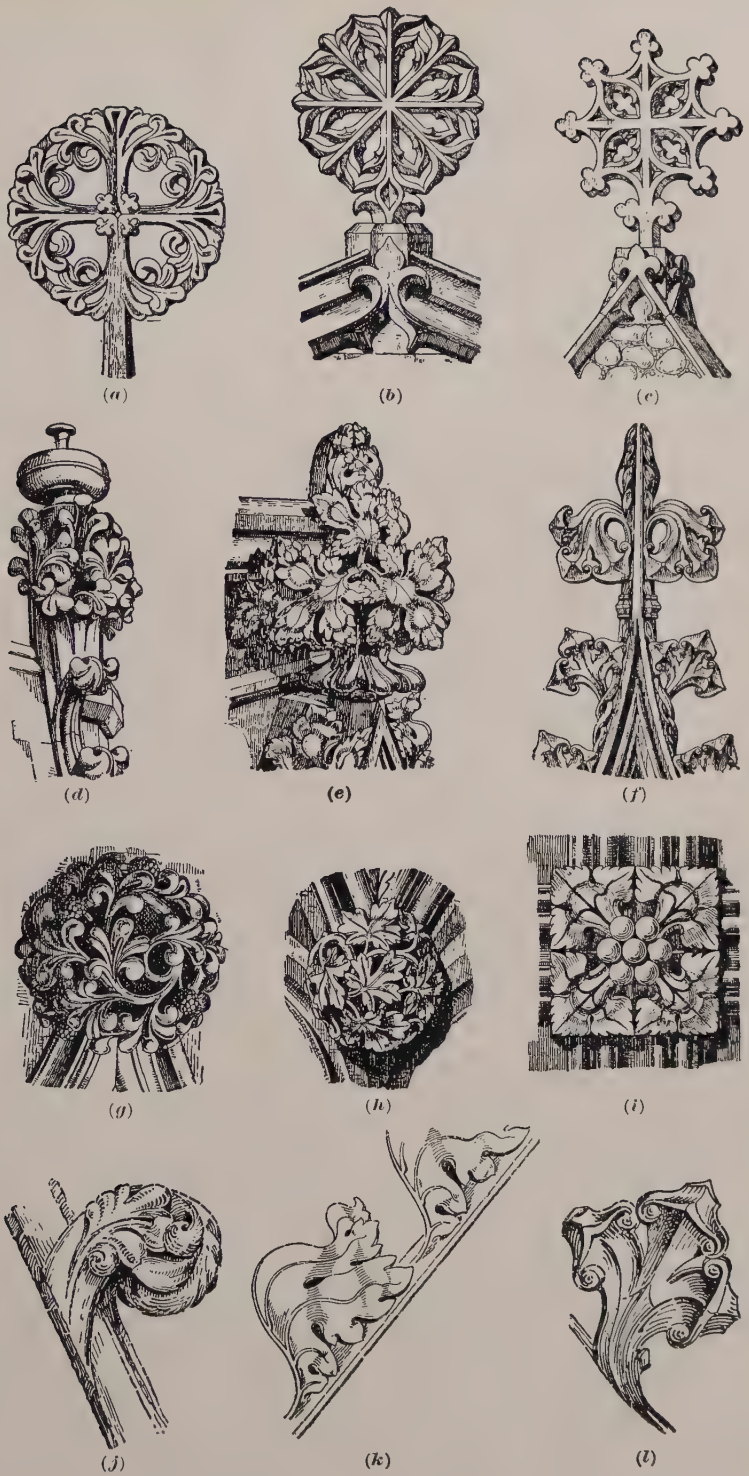


FIG. 85

period they were pierced with wavy details subdivided into panels with molded tops and carved heads beneath, as shown in (*c*). The molded top and projecting string-course for a base was retained in the Perpendicular period, but the panels of the battlements became pierced with trefoil or quatrefoil ornament, as shown in (*d*). Along the ridges of the roof,

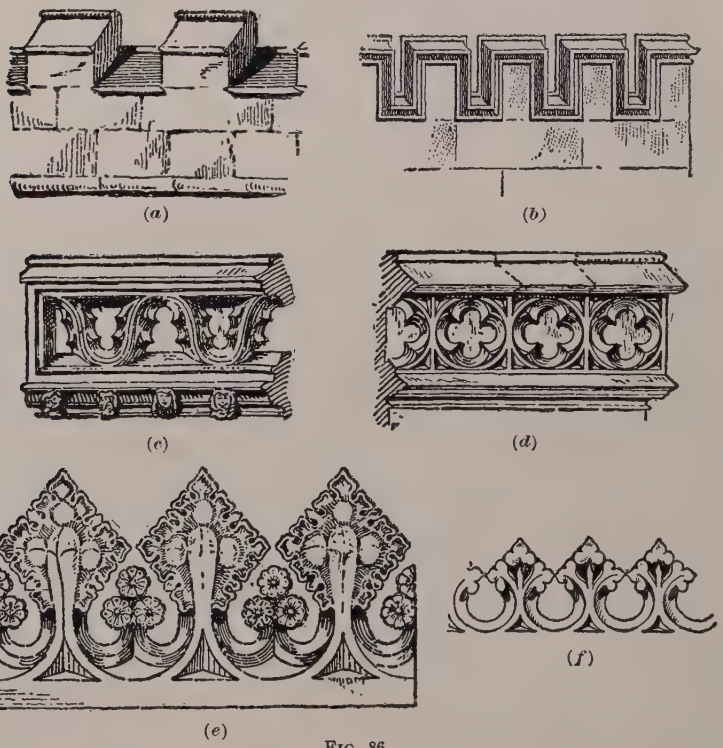


FIG. 86

crestings were introduced, particularly late in the style. These crestings were elaborately decorated and presented a foliated ornament frequently having carved flowers between, as shown in (*e*). A simpler form of cresting in which the floral decoration is omitted is shown at (*f*).

173. Wall surfaces were subdivided and decorated with various forms of diaper ornament, as shown in Fig. 87 (*a*) to

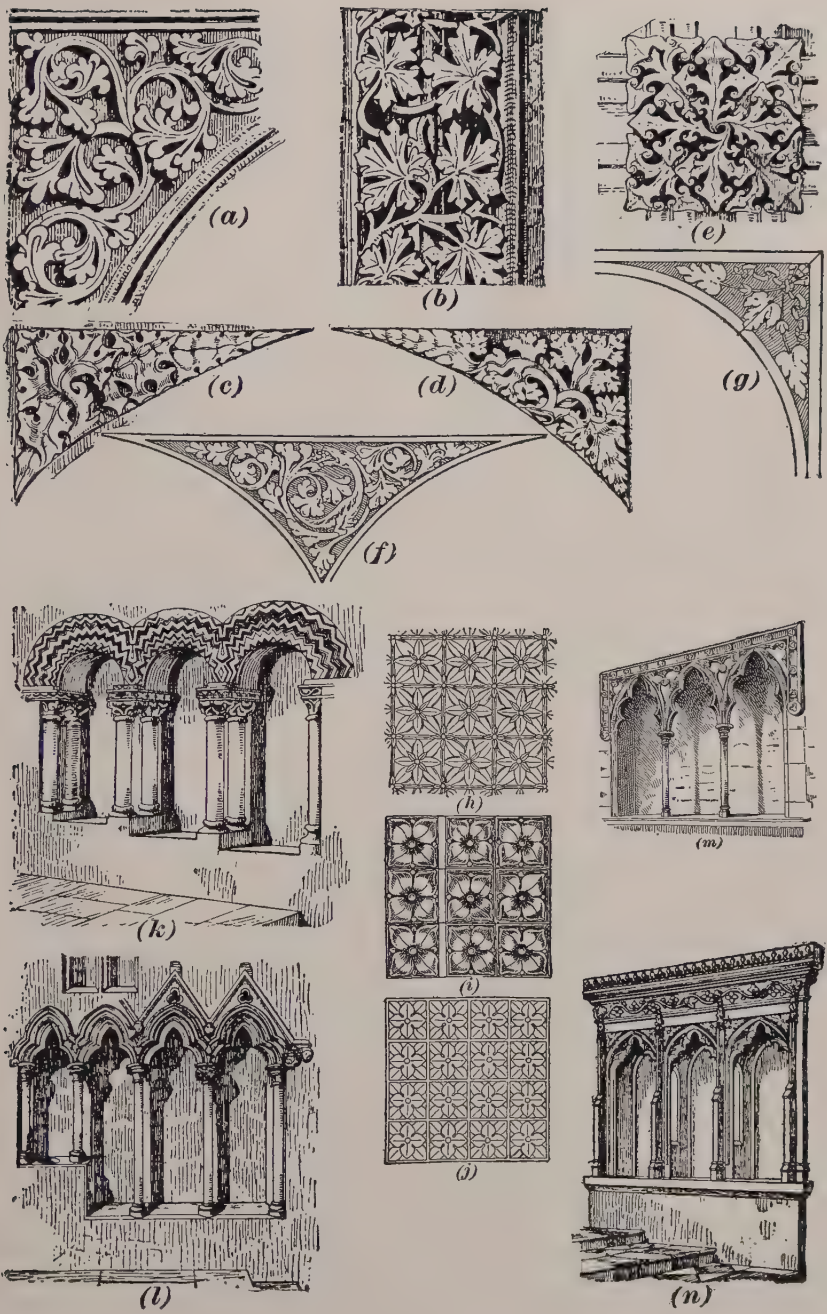


FIG. 87

(*j*), and running ornament of carved forms was used to subdivide the panels. The characteristics varied with each style, but the foliated forms used were the same as those applied to other details in each individual period. *Sedilia*, or side seats, were characterized in each period. The forms of grouping and decorations shown in Fig. 87 (*k*), (*l*), (*m*), and (*n*) are characteristic of the several periods.

174. The wall diapers were usually very simple, but were brilliant in red, blue, green, and gold (see Fig. 88). The details seem to have been stenciled, or partly stenciled, and partly worked up freehand.

Simple bands of characteristic running ornament, in which conventional bird forms were introduced, as shown in Fig. 89 (*a*), are found in Westminster Abbey, as is also a treatment of circles and heraldic shields, as in (*b*). At Salisbury, a combined circle and checker pattern, as in (*c*), is used with animal forms introduced in the circles. Elaborate color schemes were sometimes used on the moldings and as a background to the foliage of the capitals.

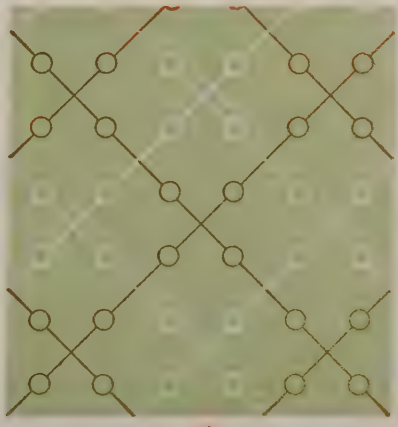
(a)

(b)

(c)

(d)

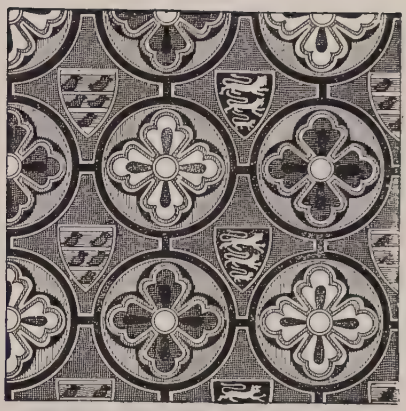
(e)



(f)

Fig. 85

(*a*)



(*b*)

(*c*)

(*d*)

(*e*)

(*f*)

FIG. 89

REVIEW EXERCISES

1. During what period was Gothic architecture dominant throughout Western Europe?

2. (*a*) Why is English Gothic freer from foreign influences than that of other parts of Enrope? (*b*) Into what periods can English Gothic be divided? (*c*) In what details do the characteristic principles of each period lie?

3. Describe the characteristics of (*a*) Norman vaulting, (*b*) Early English vaulting, (*c*) Decorated vaulting, (*d*) Perpendicular vaulting.

4. Make a sketch of the cross-section of a church showing the structural details and general arrangement characteristic of the (*a*) Norman period, (*b*) Early English period, (*c*) Decorated period, (*d*) Perpendicular period.

5. Describe the characteristics of the buttresses of the four periods of English Gothic architecture.

6. Describe the characteristics of the piers and columns of the four periods of English Gothic architecture.

7. Make drawings in elevation of Gothic capitals illustrating the characteristics of each of the four periods of English Gothic architecture.

8. Make four drawings of Gothic window openings showing the characteristics of the four English periods, with a short description of each.

9. State briefly the characteristics of the four periods of English Gothic doorways, illustrating the details of each.

10. With a description and drawing, illustrate the characteristics of English Gothic moldings from the Norman to the Perpendicular period.

11. Give a general description of the characteristics of English Gothic ornament, illustrating with drawings of examples covering the four periods.

12. Make four sketches of Gothic wall decoration, two to be in color, and two in wash work.

NOTE:—All drawings to be neatly drawn on sheets 9 inches by 12 inches with a $\frac{1}{2}$-inch border, and to be of sufficient size to show details clearly. Two or more drawings may be placed on one sheet if desired, but should not be crowded.

HISTORY OF ARCHITECTURE AND ORNAMENT

(PART 3)

FRENCH GOTHIC

(987 A. D. to 1461 A. D.)

INFLUENCES

1. Geographical, Geological, and Climatic.—France (see map, Fig. 35, *History of Architecture and Ornament*, Part 2), may be divided by the river Loire into two sections. The northern section was inhabited by the Franks, while the southern one was occupied by some of the Roman race. This fact, together with the geological and climatic influences, has already been considered in *History of Architecture and Ornament*, Part 2, page 201.

2. Religious.—The crusades represented by Louis IX of France (1248 to 1254) gave rise to great religious zeal in this country and consequently to the erection of many important ecclesiastical structures. The clergy rose to great power and influence owing to its unswerving justice and adhesion to royal interests. Abbé Sugar, prime minister of Louis VII (1137 to 1180), exercised great influence in church building, and while the pope at Rome was the controlling spirit of the entire ecclesiastical establishment, the local liberties of the French Church were recognized. Various

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cults and sects arose and gave fame to certain shrines and chapels, to which pilgrimages were made from all parts of the country, bringing wealth and prominence to these edifices and thus enabling them to express their affluence in rich architectural treatment. Cities erected their cathedrals with an enthusiasm that became a characteristic of the nation, and in consequence we find that in France the most important religious structures were erected in its most prominent commercial cities.

3. Political and Historical.—The beginning of modern France was in 987 A. D., when Hugh Capet became king of the feudal monarchy. During this period the fiefs were occupied by nobles of widely different races. These nobles were almost constantly at war, and the development from the Romanesque style to the Gothic style varies in different parts of the country in accordance with the local political environments and the differences of language and customs. Moreover, in the south of France, there were, and are up to the present time, remains of many Roman structures, which naturally influenced the new structures (see Fig. 75, *History of Architecture and Ornament*, Part 1).

Between 1180 and 1223, Philip the Great, a descendant of Hugh Capet, united the French provinces into a homogeneous nation by destroying the feudal power of the barons. King John of England, after entering into an agreement with Philip, betrayed him, and in order to obtain revenge Philip declared that John had forfeited all the fiefs he held under the French crown and proceeded to conquer Normandy and all other English possessions on the Continent except Aquitaine (which had become an English province when Henry II of England married Eleanor of Aquitaine, the divorced wife of Philip's father). Philip then defeated the combined forces of the English, Germans, and Flemish in the battle of Bouvines, 1214 A. D. The power of France thus became so strong that the English barons offered the English crown to Philip's eldest son, who, as Louis VIII, was afterwards king of France.

CHARACTERISTICS

4. Though Gothic architecture in France was the same in principle as in all other parts of Europe, the vertical, or aspiring, tendency was accentuated by a greater height of the nave than in England and by high-pitched roofs with numerous spires and crockets, pinnacles, flying buttresses, etc., and the windows were tall and rich in tracery. The style is not so pure as the English Gothic, but this can be accounted for by the fact that France is not isolated from the Continent as is England, and the architecture therefore did not have the same opportunity to develop independently. Nevertheless, French Gothic architecture presents the same general development as does the English style during its four periods, but the French periods are known under different names, owing to the differences in local influence. The periods into which French Gothic architecture is divided are, the Early French, or 13th Century; the Rayonnant, or 14th Century (from a term meaning radiating, on account of the characteristic rose windows); and the Flamboyant, or 15th Century, from the flamelike form that the traceries assumed during this period. All the great structures were erected in the first half of the 13th century, and of these about 150 were cathedrals for which the funds were provided by the people at large and not by the monastic establishments. This system being entirely different from that practiced in England, a great variety of plans and arrangements is found in different parts of France contrasting with the uniformity of plan in the English system.

5. The first requirement of all cathedral buildings was to have the structure large enough to accommodate the mass of people that assembled regularly for worship. Thus, the first element that contributes to impressiveness in all cathedrals is the *size*—the *vastness*. Size may be produced in three ways: by length, by breadth, or by height. To construct a long building is a comparatively easy matter. One section after another may be added without limit so long as

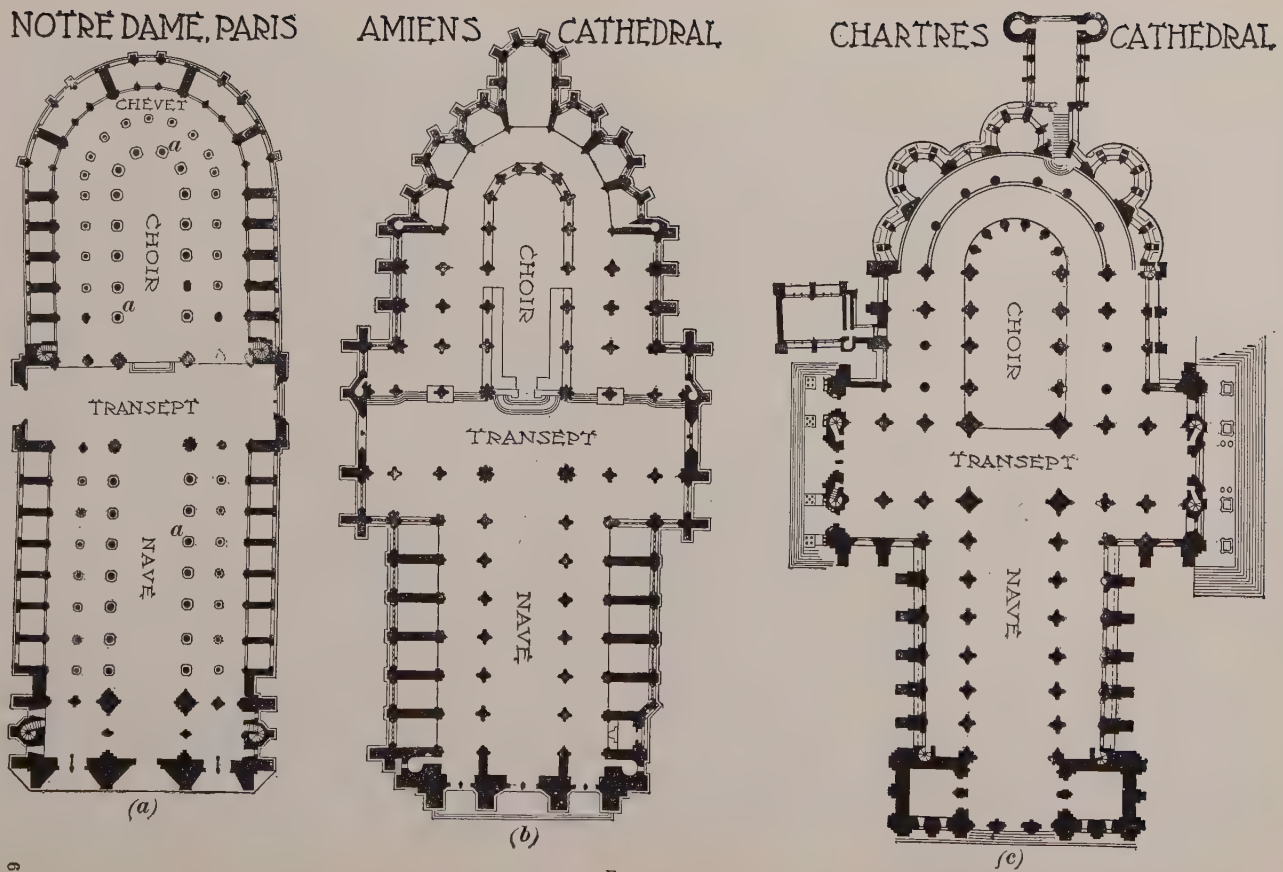
the material holds out. The erection of a wide building, however, is quite a different matter. The roofing of a structure 100 feet wide is a far more serious problem than the roofing of one only 20 feet wide, and in the erection of the medieval cathedrals, there came a limiting point where it was not possible to make buildings any wider. Then came the question of height. To construct a stone roof on walls 20 feet high is far simpler than to build one on walls 100 feet high, as the walls, besides carrying their own weight, must be sufficiently strong to withstand the vault thrusts. For instance, a pile of single bricks four courses high, will stand by itself with little danger of collapse, but continue the courses up to twenty bricks in height, and the slightest touch will throw them down. In order to carry weight, a wall must have a thickness in proportion to its height, or else it must be strengthened at the point where the outward pressure is greatest. The first of these methods is Roman and Early Romanesque, and the second is late Romanesque and Gothic.

A wall may be strengthened by means of a short wall built either at right angles to it or against it; or the wall that is to serve as a brace may be built some distance away and have an arch, or *prop*, extending to some point in the main wall that is to be supported. The first method produces the *buttress*, while the second introduces the *flying buttress*. (See Art. **50,** *History of Architecture and Ornament*, Part 2.)

6. The proportions of length, breadth, and height vary in different periods and in different countries. The Romanesque churches along the Rhine were characterized by their great length, and some of the English Gothic churches are also long, but the development of height as a national characteristic of their cathedrals is found only in France. These high walls demand a corresponding development of buttress and flying buttress. Consequently, the French Gothic style is further characterized by an elaborate flying-buttress treatment that appears as a detail on the exterior, in contrast with the English style, in which the buttresses were

5

FIG. 1


NOTRE DAME, PARIS
CHEVET
a
a
CHOIR
a
TRANSEPT
a
NAVE
(a)
AMIENS CATHEDRAL
CHOIR
TRANSEPT
NAVE
(b)
CHARTRES CATHEDRAL
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NAVE
(c)

FIG. 2

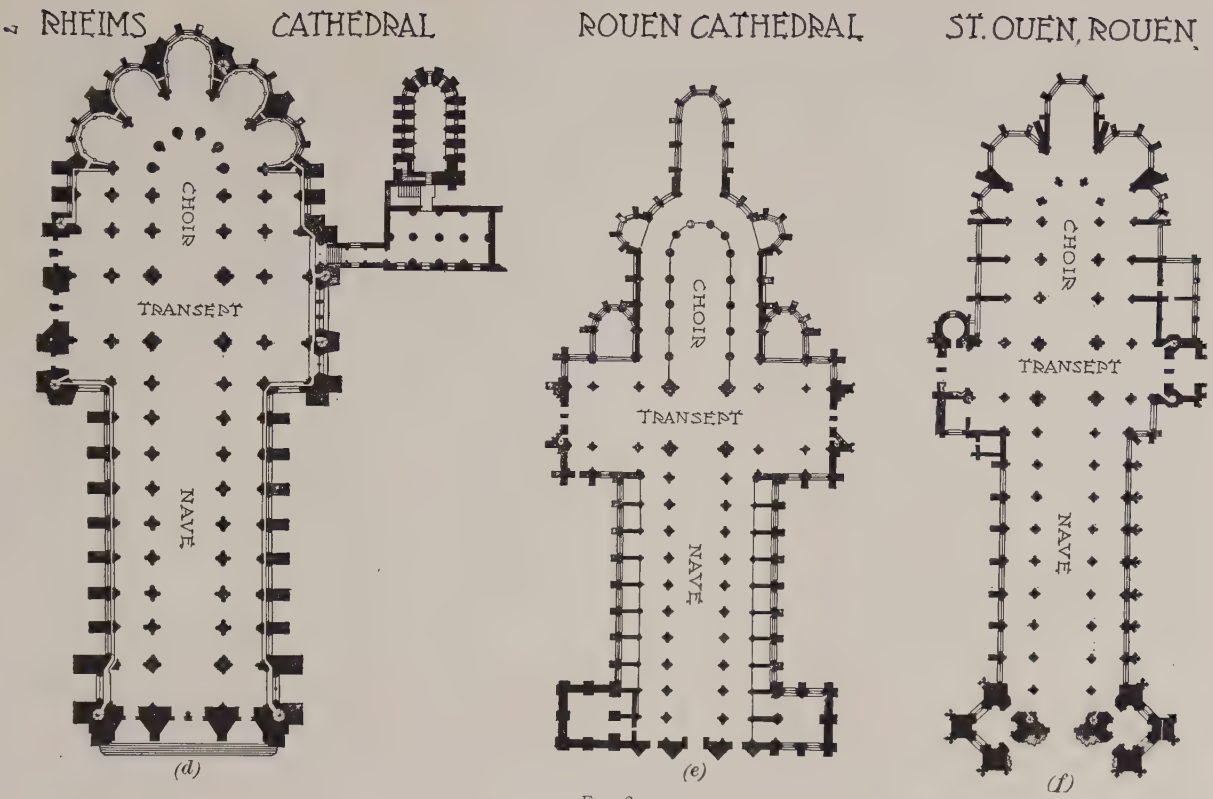

RHEIMS CATHEDRAL
CHOIR
TRANSEPT
NAVE
(d)
ROUEN CATHEDRAL
CHOIR
TRANSEPT
NAVE
(e)
ST. OUEN, ROUEN
CHOIR
TRANSEPT
NAVE
(f)

FIG. 2

frequently concealed under the roof slopes of the aisles. (See Fig. 64, *History of Architecture and Ornament*, Part 2.)

By this system, the nave walls were carried on a series of small columns, and the thrusts of the roof vault were taken up by a series of flying buttresses. The building thus consisted of a vault and upper nave walls carried on a series of columns and props (Fig. 3), and the enclosing walls along the aisles became mere screens between the structural details. As a result of this ingenious system of building, the screen walls could be pierced by vast windows, which, with their flood of colored light through the painted glass, added greatly to the impressiveness of the interior.

EXAMPLES

7. Notre Dame Cathedral.—Notre Dame at Paris, Fig. 1 (erected 1163 to 1214), is one of the oldest French cathedrals and presents a plan, Fig. 2 (*a*), typical of the French Gothic style, although the structure has been subjected to many alterations and additions. It has a wide central nave with double aisles and small transepts that do not project beyond the sides, as in the English examples.

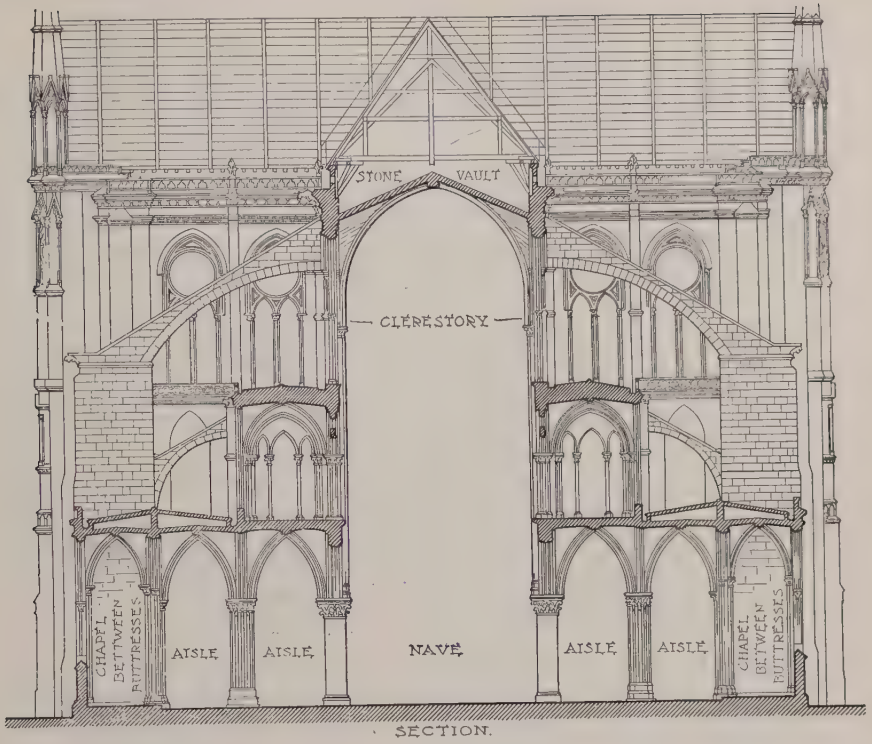
The view down the nave, Fig. 3, is most impressive. The massive piers supporting the nave walls are crowned with Corinthian capitals, showing the influence of the geographical position of France. From each of these capitals springs a cluster of three attached columns, which spread into the ribs of the vault above. This treatment adds to the lofty appearance of the nave, but was improved on in later examples by having the attached columns spring from the ground line and extend as an unbroken rib to the crown of the vault, as at Amiens, Fig. 12, while other attached columns support the aisle arches and vaults.

It should be borne in mind that, as broad as this plan, Fig. 2 (*a*), appears, the nave only is carried up to the full height and roofed, as shown in Figs. 4 and 5 (*a*), and that the dead-weight of this nave wall and the crowning vault 110 feet above the pavement is carried on the nave columns *a*,

FIG. 3

FIG. 4

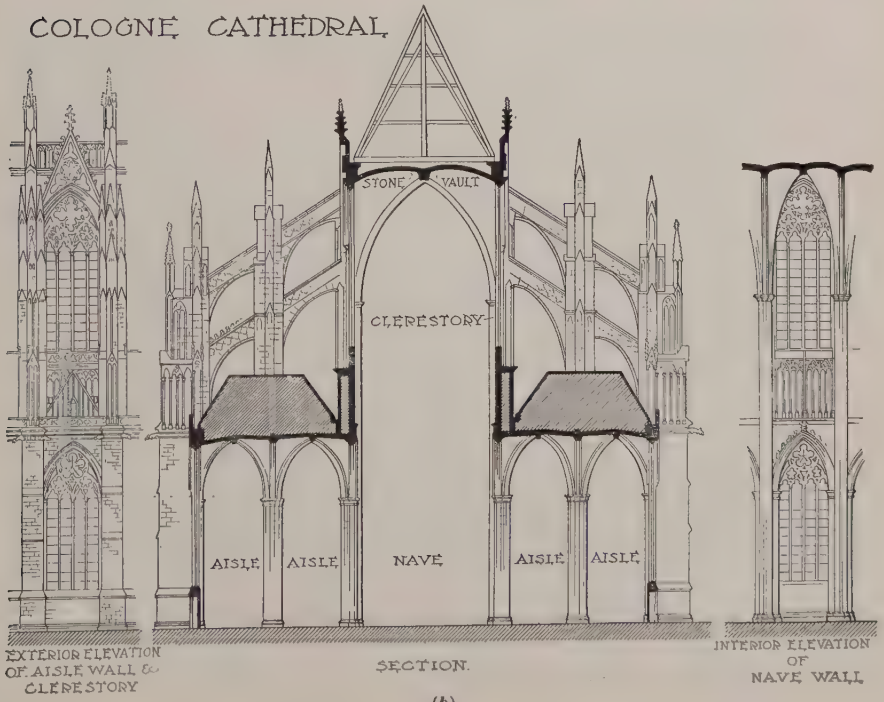
NOTRE DAME CATHEDRAL.



SECTION.

(*a*)

COLOGNE CATHEDRAL.



EXTERIOR ELEVATION OF AISLE WALL & CLERESTORY

SECTION.

INTERIOR ELEVATION OF NAVE WALL

(*b*)

FIG. 5

Fig. 2 (*a*), while the tremendous outward thrust is taken up by flying buttresses to the fixed buttresses. The weight of these flying buttresses in themselves is an important factor in retaining the thrust of the roof vaults against the bases on which they lean. It should therefore always be remembered that a flying buttress is a *prop*. Notre Dame presents the first Gothic vault of monumental proportions and the first practical demonstration of the possibilities of Gothic construction.

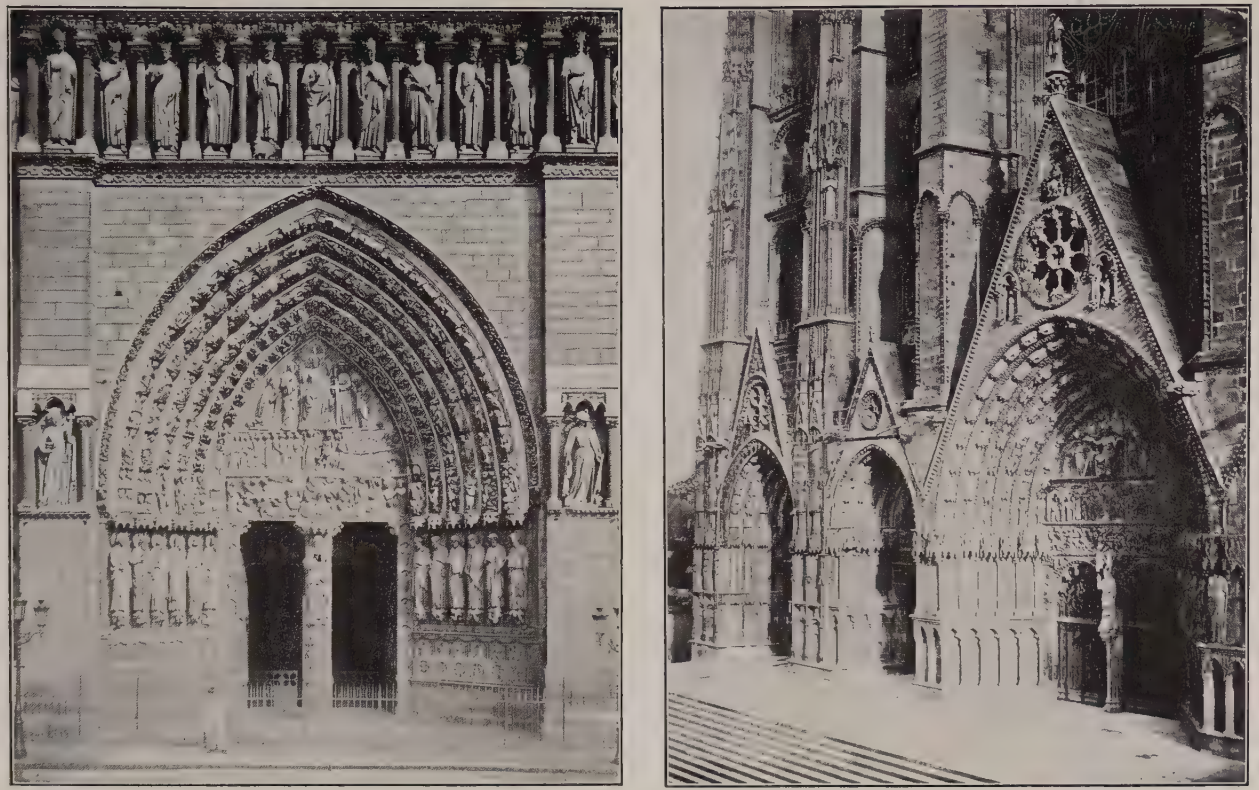
A continuation of the double aisles around the eastern end of the plan, forms a *chevet*, which is a characteristic detail of French cathedral plans. The chevet consists of the passage-way around the end of the church and usually includes the apse.

The west front of Notre Dame, Fig. 1, is one of the grandest elevations in France. A high, pierced screen masks the gable at the end of the nave between the two towers, and the horizontal band of sculptured figures, together with the open screen of interlaced arches, produces strong horizontal elements in the design, an effect that was avoided in later examples. Here, however, the bold projection of the buttresses and the freedom of the towers preserve the predominance of vertical lines.

The towers stand practically free for nearly half their height, which lends much to their impressiveness. They are magnificent in themselves, being simply and finely proportioned and possessing openings of great magnitude.

Entrance is effected through three portals at the end of the nave and aisles. These portals have recessed arches, as in the Romanesque entrances, the central portal being six arches in depth, and the soffits of the arches being filled with elaborate carvings and statuary, as shown in Fig. 6 (*a*). The main lines of this design are repeated in the more elaborate designs that follow it. However, notwithstanding its simplicity, this edifice still remains unsurpassed in noble dignity and harmonious proportions.

8. Bourges Cathedral.—Bourges Cathedral, which was commenced in 1190, resembles Notre Dame somewhat in



(*a*) (*b*)

FIG. 6

plan, but differs from it in having no transepts. It is very short in comparison to its width, but with its nave 117 feet in height and unbroken by transepts, it presents one of the most imposing interiors of the period, Fig. 7.

The city of Bourges is only a few miles south of Paris, but there is a material change in the climatic conditions, and this change is strongly reflected in the manners of the people and the architecture. Here, the old Roman ideas were well rooted, and the Gothic style never entirely overthrew them. Pointed and round arches are freely intermingled, apparently with little discrimination, but usually with characteristically Gothic supports and mullions.

The west front of this structure, Fig. 6 (*b*), presents five portals, each opening on a separate aisle. The portals are deeply recessed and are carried out slightly beyond the buttresses, instead of simply piercing the walls between the buttresses, as in Notre Dame.

9. Chartres Cathedral.—Chartres Cathedral, Fig. 8, was built between the years 1194 and 1260, and is noted for its sculptures, its spires, and its painted glass. While there is not so much painted glass in this structure as in the cathedral at Bourges or at Rheims, it is particularly brilliant and rich in color effect. The sculpture of the west front of the Chartres Cathedral forms one of the most important collections of Gothic statues in Europe. The transept porches are also richly carved, and present examples unexcelled in any other structure. Over the main portals is a magnificent rose window, which fills the entire tympanum of the nave vault within. This window is beautifully designed in Early Gothic plate tracery, and dates from the early part of the 13th century.

Although at first, the north tower at Chartres seems to be more interesting than its mate, closer study reveals detail in the south tower that characterizes it at once as one of the most interesting in the country. The octagonal spire springs gracefully from the top of the square tower, and the method of joining the two forms is most ingenious. It is

15 FIG. 7

FIG. 8

(a)

(b)

FIG. 9

accomplished through the employment of eight gables, which serve as finishes at the top of the tower buttresses, and at the same time cover the junction of the octagonal spire with the square tower. In simplicity of style and purity of line, the south tower is one of the noblest examples of the Early Gothic style. The north tower is more ornate, but the upper stages are weak and there is a lack of continuity between the lower part and the portion above the screen-wall arcade. Towers were planned to flank the transepts, but they were never carried above the nave walls.

The plan of Chartres, Fig. 2 (*c*), shows a double row of aisles around the choir, but only a single row each side of the nave west of the transepts. The flying buttresses that support the nave vault are in three tiers, one above the other, as can be seen in Fig. 8, the lower two being connected with radiating arms, like the spokes of a wheel, as shown in Fig. 9 (*a*). This arrangement enabled the builders to make the lower arch very light, as the weight of the one above it would keep it in place.

10. Reims Cathedral.—Reims Cathedral, Fig. 10, built between 1212 and 1241, presents a western front similar in outline to, but more elaborate than, Notre Dame. The façade is strongly marked by vertical lines and is unusually high in proportion to its width. The openings are tall and narrow, and the gables introduced over the portals are acutely pointed, all of which tends to give the façade a lofty aspect that is very imposing. There is one horizontal feature in the upper part, consisting of a gallery of niches containing statues. This, however, is broken around the towers so that the vertical feeling is not interrupted. The rose window over the central portal is a very beautiful example of tracery work, but its insertion under a pointed arch seems to be badly conceived, as the two forms do not harmonize.

The triangular spandrels above the arch are filled with curious carved figures that are varied in size to suit the space, while the canopied niches each side of the portals contain figures of the Madonna and the Apostles. The

19 FIG. 10

portals at Reims are similar to those at Amiens, Fig. 11, except that they are shallower and contain glass windows in the tympanum instead of carvings. The change is not an improvement, as the glass does not show to good effect on the exterior; neither does the interior require extra illumination at this point, while carving would look well.

The number and size of the flying buttresses at Reims, with their elaborately carved crockets and canopies, as shown in Fig. 9 (*b*), are not excelled in any part of France. The general tendency, however, is toward an overelaboration, or redundancy, of ornament. The detail is beautifully and wonderfully executed, but there is too much of it.

11. Amiens Cathedral.—The plan of the cathedral at Amiens, Fig. 2 (*b*), is generally considered as typical of the French style. It has been neither altered nor rearranged since the erection of the structure in 1288, and consequently does not present that mixture of period details which characterizes the English plans. The plan consists of a broad nave between aisles of half its width, and the aisles extend around the choir at the east end, where chapels between the buttresses form a chevet. The transept is constructed with aisles similar to the nave, but does not duplicate the nave in treatment, as was done at Reims and Chartres. This elaboration of the transept and the introduction of chapels between the buttresses developed from the previous style, but the elaboration of the fronts as they appear in Northern France is far beyond anything attempted in the designs of the Romanesque period.

12. The Amiens, Reims, and Notre Dame cathedrals are all different, yet they present many points of similarity in detail. The façade of Amiens, Fig. 11, consists of two towers in front of the aisles and a screen wall between them, enclosing the nave. The lower portion is occupied by three portals, the central one opening into the nave and the other two opening into the aisles. Immediately above these portals are two bands of arches extending across the entire façade. The upper band consists of a series of niches

Fig. 11

containing statues, and the two occupy a portion of the triforium on the interior. Above the arcades, the wall is pierced by an elaborate rose window that corresponds in position with the clearstory of the nave. At this point the two towers disengage themselves from the front wall and take form as separate details, although the screen wall is still carried up between them, and is crowned with two series of arcades that cover the end of the nave vault.

This treatment of the façade is characteristic of the French style, and variations of it are to be found in Notre Dame and Reims. The proportions of Notre Dame Cathedral are better, owing to the superior designing of the towers and their relations to the rest of the building. The nave of Notre Dame is not so lofty as that of Amiens, as it was built a half century earlier. Therefore, the rose window at the end of the nave lies immediately over the central portal, with only one intervening band of statuary. However, this permits the arcade above the rose window to be much more developed in Notre Dame, where it extends across the entire façade and forms a prominent detail of the front, entirely covering the end of the nave.

The west façades, and especially the portals, are the glory of the French style. There are no entrances in England that can compare with the portals of Notre Dame, Amiens, Bourges, Chartres, or Reims. Peterborough and Lincoln have distinctive portal treatment, but in neither case approach the dignity of the French examples.

13. Elaborate decoration is characteristic of Gothic style in all countries. The designers never seemed to weary of an elaboration of details, and even when the execution is crude and unskilled, there is a sincerity about it that always makes it interesting. The sculpture of the portals presents figures in great profusion, but without any feeling of over-elaboration or redundancy. There is always, throughout the façades, a judicious arrangement of highly decorative and plain surfaces, so that a neutral balance prevails throughout the design.

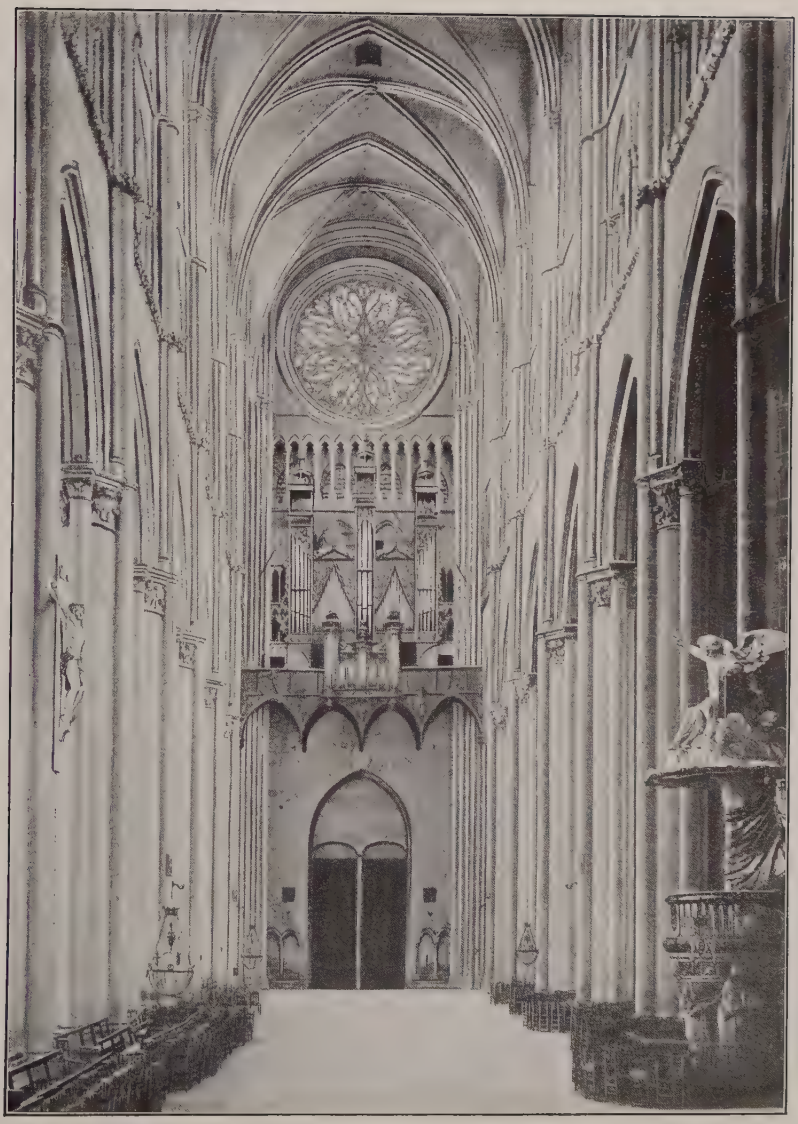


FIG. 12

14. The nave of the cathedral at Amiens, shown in Fig. 12, presents one of the most imposing interiors in Europe. The dimensions are unusual, and the feeling of vastness is expressed without overstraining any one detail. This nave is 470 feet long and 144 feet wide, and the vaulting over it is 140 feet above the pavement. The walls of the interior are plain and present a marked contrast in this respect to the elaborate sculpture on the exterior. The capitals are simple, and the columns consist merely of four semidetached shafts, grouped around a circular pier. A band of simple carving extends along the top of the nave wall, marking the beginning of the triforium, while the clearstory and triforium themselves present very little decoration. The vault ribs are simply molded and as few as possible in number, unlike the vaults of England, and the vertical lines, beginning at the base of the columns, sweep unbroken into the crown of the nave vault with a simplicity that adds greatly to the impressiveness of the interior.

15. Abbey Church of St. Ouen.—The Abbey Church of St. Ouen, at Rouen, the plan of which is shown in Fig. 2 (*f*), is one of the most interesting structures in France. This abbey is the most ancient in Normandy, having been founded in the year 533; but the present church was not begun until 1318. It has been burned and rebuilt twice, so that there is little left of the original structure except in the northern apse of the transept. The rest of the edifice was erected between 1318 and 1345, and is probably the latest pure Gothic work of importance in France.

St. Ouen exemplifies absolute perfection of lightness and grace. The disposition of ribs and buttresses represents the most admirable arrangement of balanced thrusts. Its Gothic framework is merely a skeleton. The tracery is flamboyant, but flamboyant restrained within reasonable limits, and although the church is most beautiful from every aspect, it has the appearance of being almost overdelicate for so large a building. The tower, Fig. 13, at the intersection of the transept and nave suggests English influences, as this

Fig. 13

Fig. 14

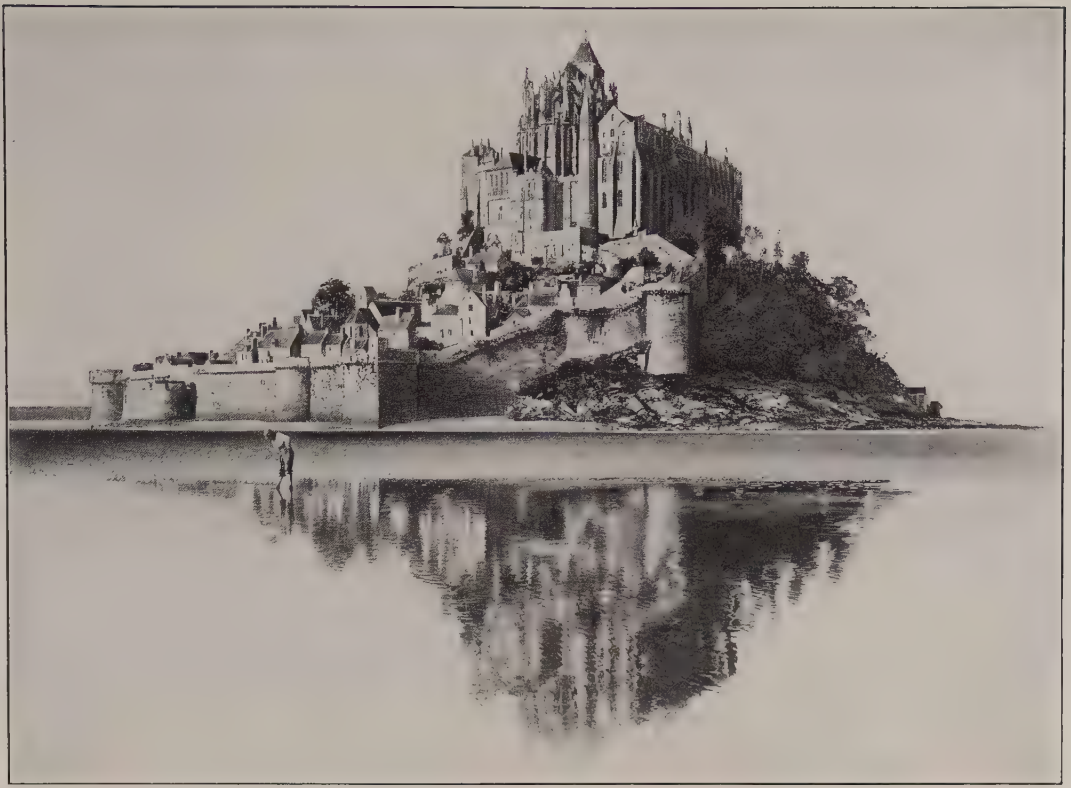


Fig. 15

arrangement was characteristic of the English cathedrals. The western façade, Fig. 14, is of much later date than the rest of the structure.

16. Abbeys and Monasteries.—There were many abbeys and monasteries founded throughout France. Probably one of the most interesting is that of Mount St. Michel, Fig. 15, on the coast of Brittany. It is built on a lonely rock that rises abruptly from the sea, but at a point where the tides rise and fall to such an extent that a part of the time it is surrounded by a vast expanse of wet sand and the rest of the time with pounding waves of the ocean. Originally founded as an abbey, it afterwards became a fortress, as it was close to the coast, and in the numerous wars in which Normandy was involved, it was dragged into conflict.

The early history of the abbey is lost, but it was founded, according to tradition, in the first decade of the 8th century, although no traces remain of any constructions earlier than the 11th century. However, during the dark ages, it preserved the thread of history and kept alive the ancient arts and sciences.

The town of Mount St. Michel is surrounded by a military wall that is protected by towers and turrets. Within this wall lines of ramparts wind about the hill toward the monastery at the top. These ramparts are fortified in every way known to medieval warfare. At the top of the hill, the real entrance to the monastery is reached after climbing a long flight of stone steps. The entrance is flanked by two great towers, with ominous machicolations between them, as shown in Fig 16.

17. The Abbey Church is at the top of the rock. The interior presents a picturesque combination of columns and arches, of both Norman and Gothic design, almost overwhelming in massiveness. From the center of the magnificent Norman nave, its massive details can be compared with the delicate traceries of the Gothic choir, Fig. 17; but even more interesting than this is the contrast between the crypt

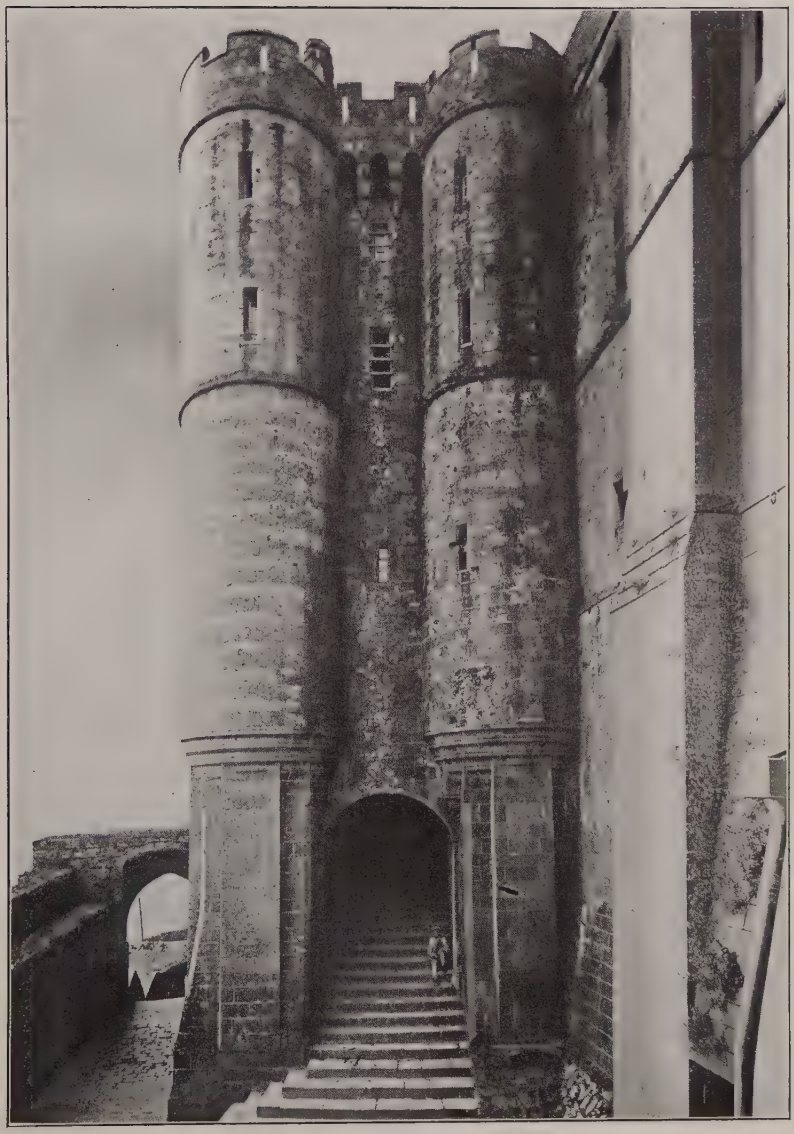


FIG. 16

FIG. 17

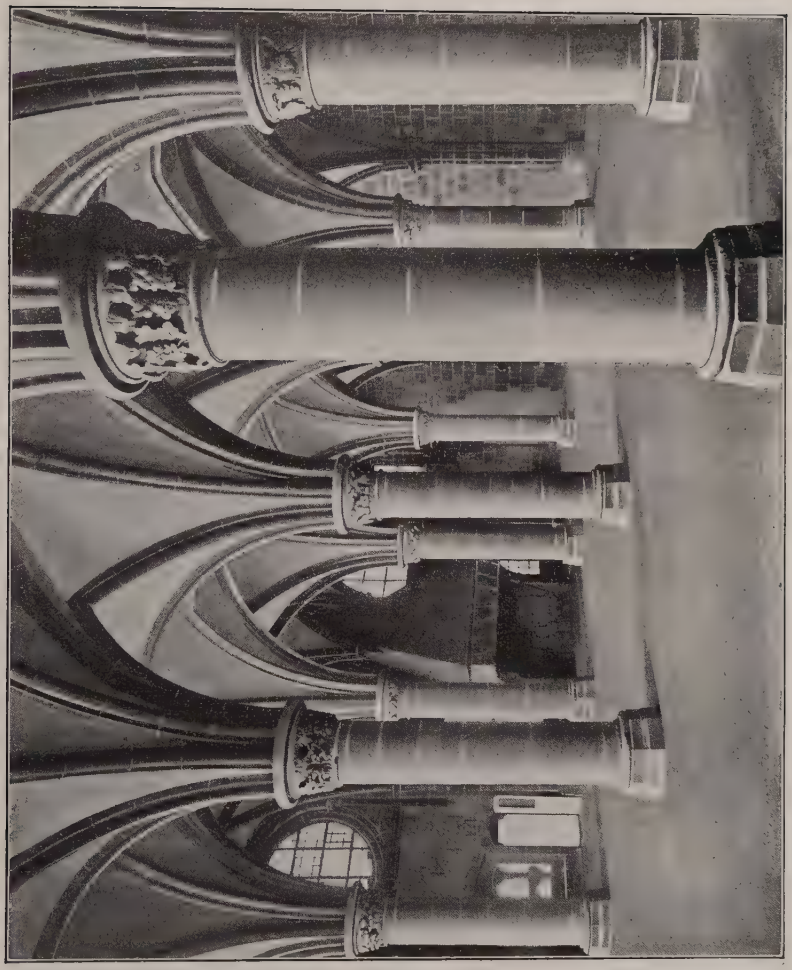


FIG. 18

I L T 303—22

under the church and the cloisters of the so-called "Gothic marvel" on the other side of the mount. The fact that the monastery was built on a mount rising from the sea prevented the planning of the structures from being carried out strictly on the Benedictine system. The difficulties overcome in the construction of the building on the north side have given it the name "Gothic marvel." The structure is situated at the top of a rugged cliff 160 feet above the level of the sea, which cuts it off from the mainland. All the granite used was quarried on the mainland coast by the monks and then transported across the intervening water.

The building is in three stories, the lowest containing the almonry, or place for the distribution of alms; the intermediate story, the refectory and chapter room, Fig. 18, for the Knights of St. Michel; and the third, the dormitory and cloisters. The chapter room was finished about 1220 and contains four vaulted aisles of unequal width supported on three rows of columns, two of which rest on the piers of the almonry, while the third row rests on the rock itself. The columns and their capitals, together with the ribs of the vaulting, are deserving of special study. The capitals, though similar in general appearance, are widely different in detail, and each vault rib descends independently to the circular abacus. The simplicity of the ribs and the arrangement of the joints are typical of Early French Gothic construction.

18. Above the chapter room, as just stated, are the cloisters, Fig. 19. These were finished in 1228, and are considered to be the most delicate and graceful of Gothic structures. They are built around an open court, similar to the Moorish Court of the Alhambra [see Fig. 80 (*a*)], and it would appear, in spite of the isolation of the spot, that some Moorish influence had been at work when they were designed. Toward the central court, the cloisters are supported by a double row of pointed arches resting on slim granite pillars having an exquisitely groined, narrow vault behind the rows. The capitals are of the plain bell form with circular abacuses, which are common in English Gothic examples but rare in

Fig. 19

French Gothic. The piers of one arcade alternate with the point of the next, and allow the introduction of a graceful scroll from the capital of each alternate pier. The spandrels are elaborately worked in foliated ornament that is beautifully executed and still in a fine state of preservation, and the whole is surrounded by a cornice composed mainly of flowers carved in soft limestone, of which material the arches and other carvings are also composed. The remainder of the construction is of granite.

ANALYTICAL STUDY

PLANS

19. There seems to have been a wide difference in ideas between the English and the French Gothic architects. The plans of the English cathedrals were long and narrow, the length being about six times the width, and the vaults over the naves were low. Cloisters were a characteristic detail, owing to the fact that many English cathedrals were erected on the foundations of, or through the influence of, the monasteries. The cloisters connected with the separate buildings, and the transepts were bold and conspicuous, projecting so far from the main structure as to form a distinctly crucial plan.

In France, however, the plans are short and wide, being about four times as long as the width. The naves are very high. The cloisters are rarely found in any example, except in the extreme south, and the transepts are slight in projection, except in a few instances, as in Rouen Cathedral, Fig. 2 (*e*), while in some cases they are omitted entirely. Side chapels within the church are numerous and are often introduced between each pair of buttresses, as the adoration of individual saints was popular in France and the saying of special masses was more in vogue than in England. In fact, side chapels are seldom met in England, owing to the monastic foundation of the English churches.

The east end of the French church is round, as a rule, forming the chevet, Fig. 2, or processional aisle, while the

English structure was square across the end. Double aisles, as at Notre Dame, Amiens, Bourges, Reims, and Chartres, are common in the French plan, while only two churches in all England possessed this characteristic. Two towers emphasize the western elevation of the French cathedrals, and only a small pinnacle emphasizes the intersection of the transepts and the nave except in the church of St. Ouen, Fig. 13; whereas, in the English cathedral, the tall central tower at the intersection of the transept was the most prominent feature of the structure. Occasionally, in England, prominence was given to a single western tower, as in some western churches, or to double towers, as at Westminster; and in some parts of Normandy, central spires are common.

WALLS

20. The early English buttresses were flat projections. Later, they were much more pronounced and diminished in depth as they arose, the offsets occurring at two or three intervals of the height, the top being crowned with a pinnacle, and the sides being ornamented with niches and later with panels.

In France, the buttresses appear in the Romanesque period about as in England, although they are sometimes semicircular in plan. Later they became very deep, but they do not appear prominently on the exterior of the church, owing to the facts that chapels were built between them and that the walls of the church were built at the outside of the buttresses instead of at the inside [see Fig. 2 (*a*), (*b*), and (*c*)]. These projecting buttresses, like the English, are offset in two or three intervals, the slope, or weatherings, being flatter the higher they appear above the eye, whereas the weatherings of the English buttresses become steeper. In many cases the French buttresses are nearly vertical and without any offsets, while the English buttress of any height is always offset. Flying buttresses exist in some English cathedrals, but they are usually hidden under the aisle roof; in the French cathedrals, owing to the great heights of the

nave and aisles, the flying buttresses are elaborated into an important detail (see Fig. 4).

The interiors of French churches gain effect from their great height, and they are extremely plain, possessing little tracery and ornamentation; on the other hand, the English cathedral is lower and depends on the elaboration of its triforium, the perplexity of its piers, the variety of its clear-stories, and the richness of its vaulting. Battlemented parapets characterize the English wall, while traceried parapets are a distinctive feature of the French. The front elevation of the cathedral of Notre Dame or that at Reims is typical of the French style, whereas the west front of the Wells Cathedral or the cathedral at Westminster, Figs. 71 and 73, *History of Architecture and Ornament*, Part 2, is characteristic of the English.

ROOFS

21. In the English style, the roofs are of moderate pitch, and as the style advances to the Perpendicular period there is a tendency for the roof to become flatter. The roofs of the French cathedrals, however, were always steeply pitched, being ornamented at the ends of the gable with metal finials connected with elaborate crestings. Carpentry was in a better state of advancement in England than in France, and the framing of the wooden roofs was more scientific. Thus, in the English Gothic halls, wooden roofs of an ornamental character are worked as part of the design; whereas, in the French interiors, open-timber roof construction was never properly developed. English roofs were covered with lead; French roofs were usually covered with slate. Vaulting was used by the English designers mostly in the cathedrals and rarely in the parish churches, while vaults were used in nearly every case by the French. The domical Romanesque vault was adhered to in France, while the real development of vaulting and vault ribs characterizes the English style. Fan-tracery vaulting never appeared in France, although pendants are frequently used in the Flamboyant period, and while, in the English vaults, the joints of the

severies are either parallel with the wall ribs or placed diagonally, they are parallel or at right angles in the French vaults.

COLUMNS

22. Characteristic of the English style is the clustered shaft, and in later work this style was always preferred to the single column. In the French style, however, the columns are usually single and circular in plan, due to the influence of Roman tradition. The adoption of this style of column introduced a difficulty in attempting to harmonize the lines of the vaulting with the clumsy shaft below; whereas, in England, the early adoption of the thin shafts as a continuation of the vault ribs, created a basis for a pier formation that avoided such a difficulty. Thus, in England, the molded column or pier became characteristic, and its evolution through each period is easily followed. In the south of France, a square pier is sometimes used with three-quarter columns attached to it, either on the corners or on the faces. In other cases, moldings of the arches merge into the columns themselves without capitals.

OPENINGS

23. It is important to note the great difference in detail between the French and the English style of openings. The doorways in the English cathedrals are simple, and with one or two exceptions are in no way elaborated. The entrances to the French cathedrals, however, are richly ornamented with carved figures and are deeply set in the west fronts, as in Fig. 6. The Early English windows had "plate" tracery, but this was quickly abandoned for the "bar" tracery. The French window of plate tracery is carried throughout the style, the final development being found in the flamboyant characteristics that give that name to the period. Only occasionally are circular windows found in English examples, while such details are characteristic of the west fronts of the principal French cathedrals.

MOLDINGS

24. A great variety of moldings marks the English examples. They are bold and rich in outline and are applied much to capitals and pier arches, as well as to door and window openings. The French moldings, however, are coarse and less delicate, little attention being given to them as decorative features of importance.

ORNAMENT

25. The human figure introduced as a decorative motif was carried to the highest state of perfection in the French style, as may be seen in the great doorways of Notre Dame, Amiens, and Reims, and also in the niches and tabernacles that characterize the façades and portals of Notre Dame, Chartres, Reims, and Amiens.

The introduction of fierce, grotesque figures at the angles of towers and as gargoyles, or waterspouts, characterized the French style. These grotesques represented imps and devils of the infernal regions, or consisted of a weird combination of animal and bird forms typifying both evil and good influences. These figures may be seen around the upper part of the towers of Notre Dame, Fig. 1, while their general character may be more clearly studied by referring to Fig. 20.

These hideous creatures were not prominent characteristics in the early Christian period, but were introduced mostly in the 10th century, during the general panic that was caused by the belief that the end of the world would come in the year 1000. The object of introducing them is supposed to have been to excite a religious influence by inspiring terror in the heart of the wrong-doer and thus urge him to repentance. Thus, such creations as shown in Fig. 20 (*a*) and (*d*) were perched on the towers of Notre Dame in an attitude as if watching for their alloted victims at the day of judgment.

Through a tradition handed down from the Hebrews, the dog was considered as associated with evil, and is frequently

so classed in the Bible; hence, the double-headed creature shown at (*c*). The pelican shown at (*b*), was, however, an

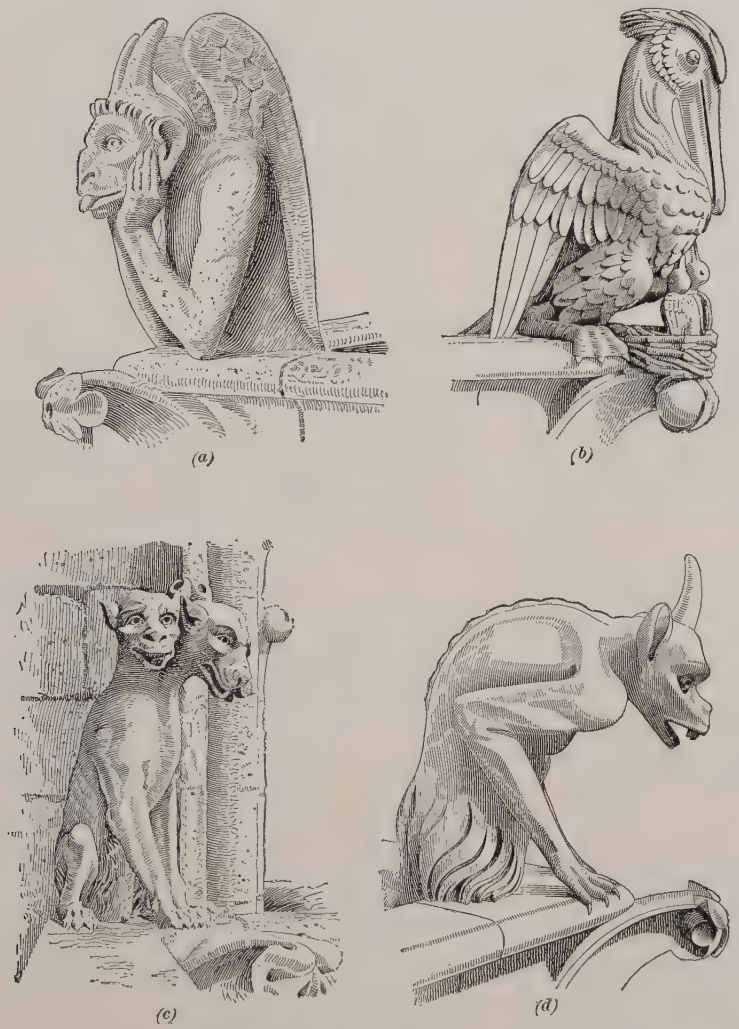


Fig. 20

emblem of repentance and atonement. According to tradition, these birds sometimes killed their half-grown young, and then, repenting their deed, tried to restore life. This

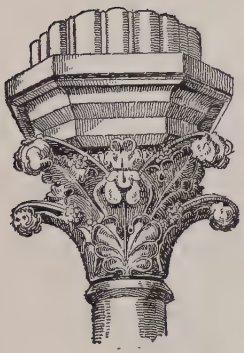
they did by tearing open their own breasts and feeding their own life's blood to the dead offspring.

26. The capitals of the columns and piers show a derivation from the Corinthian order. Crocket capitals and the stiff-leaf foliage under a square abacus are also to be found. The molded bell capitals without any foliage whatever are rare, except in Normandy, where English influences were felt. In England, however, the classic type of capitals is rarely found. The earliest carved capitals introduced the characteristic stiff-leaf foliage, and throughout all periods the bell form with the liberal projection is used under certain conditions. The abacus of the columns is seldom square, but is frequently octagonal or polygonal and usually round.

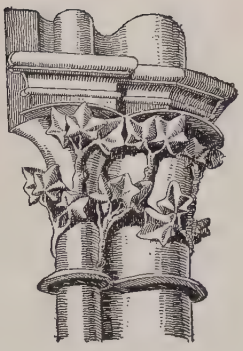
In the Early French capitals, the foliage springs directly from the tops of the shaft, as shown in Fig. 21 (*a*), and spreads out so as to support the octagonal abacus; later, however, the foliage was carved on the surface of a bell-shaped core, as shown in (*b*). The structural relation between the foliage and the core being entirely ignored, the character of the foliage itself finally degenerated into forms similar to that shown in (*c*), where there is neither reason nor symbolism in the design.

The capital shown in (*a*) is a conventional arrangement of foliage made to crown a supporting member. In (*b*) there is a naturalistic rendering of a vine growing around the top of a supporting member, playing a decorative but not a structural part. In (*c*) there is a grotesque foliation planted against the top of a supporting member. This plays neither a decorative nor a structural part, and it actually destroys the governing lines of the support. These three capitals are, respectively, examples of the Early French, Rayonnant, and Flamboyant periods.

27. The running ornament presents the same characteristic during the three periods, as shown in Fig. 21 (*d*), (*e*), and (*f*). The foliage in (*d*) seems to grow naturally and gracefully from the surface, while that in (*e*) springs geometrically and at precise intervals from the lower member of



(*a*)

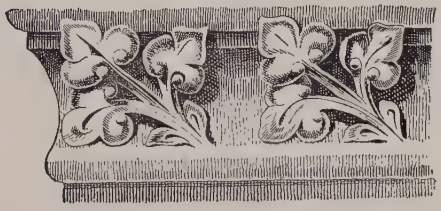


(*b*)

(*c*)

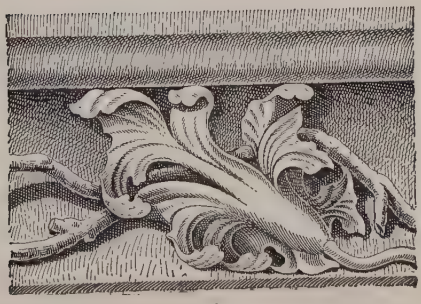
(*d*)

(*g*)



(*e*)

(*h*)



(*f*)

(*i*)

FIG. 21

the molding. In (*f*), however, the foliage does not seem to be attached to the surface at all, and the leaf form is as grotesque as that on the capital shown in (*c*).

In (*g*), (*h*), and (*i*) are shown three bosses as they were carved at the intersection of the vault ribs.

FIG. 22

28. The stairway shown in Fig. 22 is from the cathedral at Rouen. The tracery work of the balustrade is elaborate in design and refined in execution. The designs of the first three runs are different, and the entire composition is as light and dainty as can be found anywhere in France.

The decorative sculpture in the English style, however, was not carried out nearly so extensively as in the French style, although the walls of Lichfield Cathedral and Westminster Abbey are rich in this respect. The "dog-tooth" is very common in the ornament of the early style, but the carved work varies considerably in successive periods, being conventional in the Early English period and decidedly naturalistic in the Decorated. The Perpendicular period returns again to conventionalism. Stained glass is found in both countries, although the best that existed in the French cathedrals was practically destroyed during the revolution.

29. Color Decoration.—In England, color was applied to wall surfaces and to sculpture. The roofs and screens of the Perpendicular period show elaborate combinations, and these characterize the details of the French style also. In both cases are found hangings imitated in painted wall decorations, as well as representations of niches, canopies, and other architectural details. In Fig. 89 (*e*), *History of Architecture and Ornament*, Part 2, is shown a design based on the intersection of a number of circles whose centers are found at the intersection of evenly spaced vertical and horizontal lines, thus showing the geometrical construction, while the color scheme was a stenciled pattern of gold against a pink ground. At (*f*) of the same figure the wall is divided in lozenge forms by equally spaced diagonal lines; a fleur-de-lis is stenciled in gold against a blue ground in every alternate lozenge and a foliated form against a gold ground in the others. These are but two of an unlimited variety of designs that were used in color decoration, all of which were simple in character and carried out as repeating diaper ornament.

DUTCH AND BELGIAN GOTHIC

(1225 A. D. to 1520 A. D.)

INFLUENCES

30. Geographical.—Holland and Belgium constituted what was known as the Netherlands, being wedged in between the German empire, France, and the North Sea (see Fig. 23). Belgium was under French rule for a long time, while Holland came under German influences. The architectural style in these countries, therefore, is influenced by their geographical position and their political relations.

31. Geological.—An abundance of good brick-making clay is found throughout the Netherlands, especially in Holland, and brick structures are therefore characteristic in these countries. Considerable stone was also used, particularly in Brussels and in Tournai, as is shown in the cathedrals of those two cities, Figs. 24 and 26.

32. Climatic.—In general respects, the climate of the Netherlands is the same as that of England, but with greater extremes of heat and cold.

33. Religious.—Constant wars between the surrounding nations brought the Netherlands successively under the control of France, Germany, and Spain. Therefore, the ecclesiastical architecture was affected by the religious forms of the country that was dominant during the erection of each particular edifice.

34. Political and Historical.—Peculiar conditions of government arising from the tendency of the people toward industry and manufacture caused much rivalry between the principal manufacturing cities. In the numerous wars in which the Netherlands were involved, either directly or as

the bone of contention, different cities sided with opposing nations, and the architecture of each developed accordingly.

Flanders became united with France in 1585 when Philip of Burgundy, first duke of Valois, married Margaret of Flan-

Fig. 23

ders, and subsequently the whole of the Netherlands came under the rule of the dukes of Valois, who were descendants of the French kings.

The characteristic structures of the Netherlands are the *town halls* and *gildhalls*, which rivaled each other in expressing the wealth of each individual community. The town halls were political buildings in which the municipal council met for the government of the city, but the gildhalls were essentially the homes and meeting places of the various societies of trades and crafts. The prosperity of the merchants and weavers is fittingly reflected in the great gildhalls at Antwerp, Ghent, Brussels, Louvain, and other cities.

The various gilds so characteristic of this period are of two kinds—the merchants' gilds and the crafts' gilds. The former probably originated in England, where early in history the king had granted certain associations of tradesmen exclusive rights to carry on trade without tolls or taxes. This amounted to a monopoly and the merchants' gilds exacted a period of apprenticeship and confined the applications for membership to their own sons and relations. The crafts' gilds were similar in character and their essential purpose was a monopoly of industrial pursuits. Members of the crafts' gilds were sometimes permitted to enroll in the merchants' gilds, and were then permitted to carry on a retail trade. Otherwise the products of the crafts' gilds were sold to the merchants' gilds and by the latter retailed to the public. All articles manufactured by the crafts' gilds were stamped with the gildhall mark, and by these marks much of the old silver and gold plate can be recognized at the present day. The gilds were subject to local laws in the cities wherein they were chartered and therefore used their utmost influence in the enactment of local ordinances. The gilds through their great monopoly became immensely wealthy and in times of danger furnished money and men for military service to defend their cities against others. In some sections, they formed leagues and maintained a military organization for the preservation of peace in the interests of trade. During the middle ages, the principal cities of the Netherlands were the richest and most powerful in Europe, and such was their rivalry that, under the feudal system, they were almost constantly at war with one another.

CHARACTERISTICS

35. Belgian architecture during this period presented two general types: the high part farthest from the coast was German in character, while the low part, commonly known as Flanders, reflects French influences. In the domestic buildings, a number of Spanish details are discernible, but in the development of their town halls, a type of architecture was evolved with national characteristics that are unequaled in any other country of Europe.

One of the chief characteristics of the Dutch is simplicity, and in their ecclesiastical structures is found a plain, barren treatment that is not present in the architecture of Belgium. It is unfortunate, however, that at the time of the Renaissance there was so much opposition to religious detail in architecture, that much of the ornament in many of the buildings was destroyed.

The Netherlanders were intensely religious, but at the same time they were skilled and experienced tradesmen and therefore expressed themselves architecturally more in their secular buildings than in their cathedrals. Where the pride of the French was concentrated in their cathedrals, the pride of the Netherlands was expressed in their municipal buildings, gildhalls, and city fortifications. In fact the wealth of the gilds is expressed in all of their architecture whether it is ecclesiastical or secular. It was the gilds that erected the great gildhalls for the pursuit of their crafts and trades, and it was through the gilds that the great town halls were erected to house the administration councils. The protection of the commerce of the cities required the construction of fortified gates and it was the gilds that made these both necessary and possible. So that the characteristics of the medieval architecture of Holland and Belgium are expressed more in their secular buildings than in their cathedrals.

It should be borne in mind, however, that these powerful organizations existed in other countries also, but they did not so directly affect the architectural character as here in the low countries.

FIG. 24

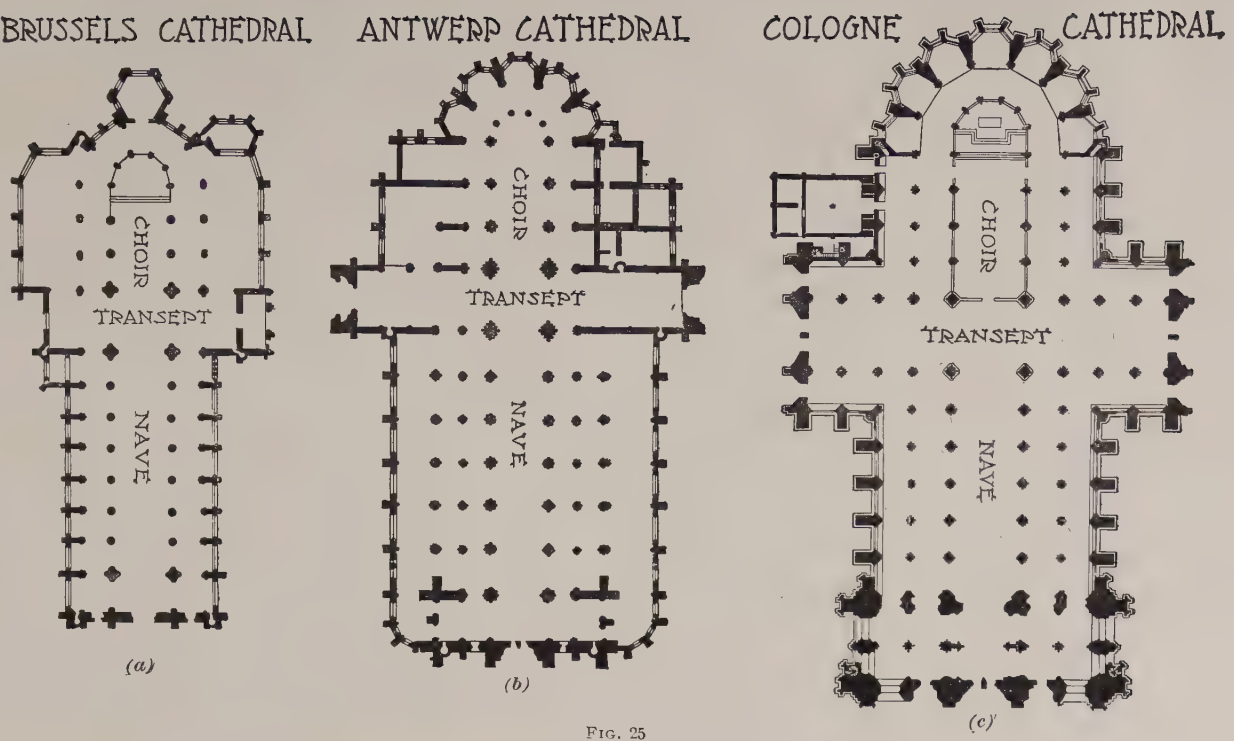

BRUSSELS CATHEDRAL
CHOIR
TRANSEPT
NAVE
(a)
ANTWERP CATHEDRAL
CHOIR
TRANSEPT
NAVE
(b)
COLOGNE CATHEDRAL
CHOIR
TRANSEPT
NAVE
(c)

FIG. 25

EXAMPLES

36. Tournai Cathedral.—In ecclesiastical architecture there are many cathedrals that show a decided inclination in the arrangement of their plans to French ideas. The cathedral at Tournai, Fig. 24, presents a comparison of the older Romanesque style and the newer Gothic in the matter of height. The nave of this beautiful church is Romanesque, as will be easily seen, while the choir is Gothic of the best period. The breadth of the two parts is about the same, and the roof of the aisles rises to about the same height both at the west and the east ends. The nave of the choir on the east, however, rises about twice as high above the aisles as does the nave on the west.

The problem that thus confronted the builders was the roofing of the nave of a building at a greater height than could be accomplished simply by the use of heavy walls to withstand the thrust of the roof, or vault. This problem was solved in the same manner as in the cathedral of Notre Dame, Fig. 4; that is, by carrying the central walls on the nave piers and by taking up the thrust of the roof vault by means of immense flying buttresses carried over the surrounding aisles. The choir, or east end, of Tournai Cathedral therefore presents much the same appearance as the east end of Notre Dame, while the nave, or west end, is much lower, in accord with the earlier Romanesque system of building. The towers flanking the transept and at the crossing give great prominence to this part of the edifice, while the west end, which is elaborate in both French and English examples, is here of secondary importance.

37. Brussels Cathedral.—Brussels Cathedral, the plan of which is shown in Fig. 25 (*a*), was erected in 1226 A. D. This building is the earliest example of Gothic work in Belgium, and probably one of the finest in the country. On the eastern end, the French chevet and choir are partly developed, and the whole was vaulted with stone during the

FIG. 26

14th and 15th centuries. The west end is particularly imposing, standing as it does on a terrace approached by two flights of monumental stairs, as shown in Fig. 26. The nave of Brussels Cathedral is much loftier than the aisles, and two tiers of flying buttresses are required to take up its thrust, as shown in Fig. 27 (*a*). The sustaining buttresses are built within the side walls, as in the French cathedrals, and almost the entire space between these buttresses is taken up by windows, as is shown in the plan.

38. Antwerp Cathedral.—Antwerp Cathedral, the plan of which is shown in Fig. 25 (*b*), is remarkable for its triple aisles of equal height and its very narrow transept without aisles. One of the aisles is carried around the choir, forming a chevet, but the rest of the plan beyond the transept is irregularly cut up into chapels. The three aisles each side of the nave are of unequal width, as is shown in the section, Fig. 27 (*b*), and are independently covered with a hip roof. The clearstory therefore extends almost to the top of the nave arches, and the triforium is omitted entirely (see Fig. 28). The nave is not as much higher than the aisles here as in Brussels Cathedral, as the springing point of the nave vault is not far above the vaults of the aisles. The nave is narrower in proportion to its height than the nave of Brussels Cathedral, and, as the walls are thicker, there is no necessity for flying buttresses. The omission of flying buttresses renders unnecessary also the low, inclined roof over the aisles, as in the French and English cathedrals; so we find here a high, hipped roof quite as steep as that over the nave. The narrowness of the nave adds to the appearance of height but cramps the interior effect. The west front, Fig. 29, was finished about the year 1518, and presents the principal characteristics of the Late French style. The florid design of this front reflects the taste of the wealthy tradesmen of that period, and it is so rich that the redundance of decorative detail may be overlooked. Especially is this true of the north tower, which is one of the most delicate pieces of tracery decoration to be found in Europe.

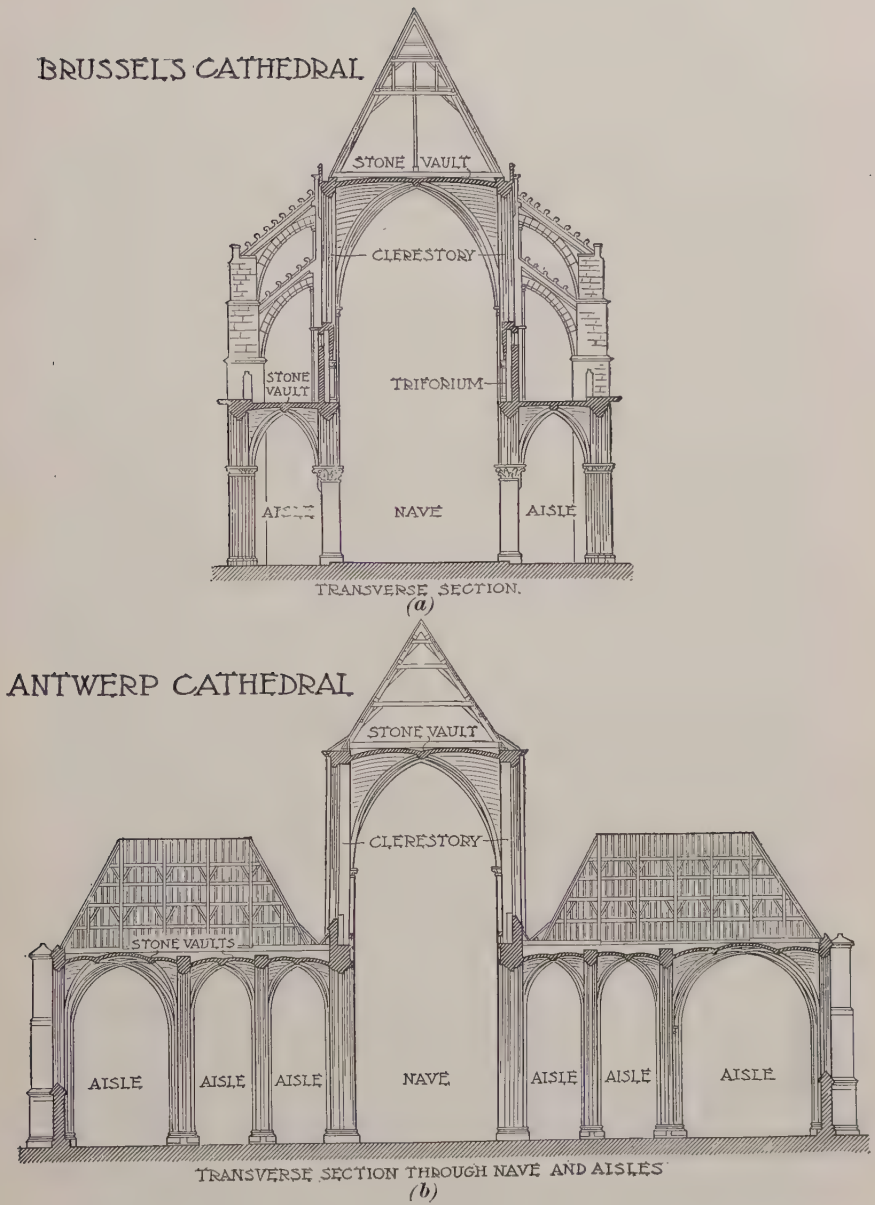

BRUSSELS CATHEDRAL
STONE VAULT
CLERESTORY
STONE VAULT
TRIFORIUM
AISLE
NAVE
AISLE
TRANSVERSE SECTION.
(a)
ANTWERP CATHEDRAL
STONE VAULT
CLERESTORY
STONE VAULTS
AISLE
AISLE
AISLE
NAVE
AISLE
AISLE
AISLE
TRANSVERSE SECTION THROUGH NAVE AND AISLES
(b)

FIG. 27

FIG. 28

FIG. 29

ANALYTICAL STUDY

PLANS

39. The cathedral plans in the Dutch and Belgian Gothic architecture were short and wide, somewhat after the French model. The chevet treatment that occurs in so many instances is also an evidence of French influence. The transepts were small and projected only slightly beyond the body of the plan.

WALLS, OPENINGS, AND ROOFS

40. The characteristics of the walls, openings, and roofs of the Dutch and Belgian Gothic period are more prominent in secular than in ecclesiastic architecture and will be considered in Art. **119.**

COLUMNS

41. Round piers, occasionally with smaller piers attached, are used to support the nave walls, but the clustered pier so common in the English style is rarely seen in the Netherlands.

ORNAMENT

42. Painted ornament was not popular in the Netherlands, although much decorative effect was obtained by various brick and tile fillings. The wealth of the tradesmen caused much of the ornament to be elaborate and ostentatious, but in the majority of cases it was carried out with a taste and refinement that is characteristic in all parts of the country.

Moldings and other decorative details lack character and possess neither the boldness of the French nor the delicacy of the English. The greatest activity in Belgian and Dutch Gothic architecture occurred at a period when the style was on the decline in other countries. The ornament is therefore of an inferior grade.

GERMAN GOTHIC
(1270 A. D. to 1535 A. D.)

INFLUENCES

43. Geographical.—On three sides—east, west, and south—Germany was flanked by large empires possessing strong national differences (see Fig. 43, *History of Architecture and Ornament*, Part 2). This situation rendered communication with other European states most convenient, and the Rhine River flowing through the north contributed greatly to the rise and development of the cities founded on its banks at the time Germany was a province of Rome.

44. Geological.—In Northern Germany there is scarcely any building material except clay, and brick structures therefore characterize the architecture of this region more than of any other country. In the south there are several stone quarries, and immense timber tracts exist in the northwest, near Hanover.

45. Climatic.—The climatic influences are the same as for Romanesque architecture.

46. Religious.—The rule of bishops in Germany was political as well as ecclesiastical, and the government of the city and that of the Church were practically one and the same thing. This system was closely adhered to in some of the principalities until the close of the 18th century.

47. Political and Historical.—The gilds and societies of craftsmen rose to great importance in Germany during this period and leagues or combinations between important cities were formed in the interests of trade; while the freemasons in particular are credited with great influence in the working out of the Gothic designs. There are no existing

records, however, and the individuality of the architects during this period is known in only a few cases.

In the 12th and 13th centuries, Germany was the heart and center of the Holy Roman Empire. Frederick Barbarossa, King of Germany and Emperor of the Holy Roman Empire, endeavored to curtail the liberties of the cities of Lombardy, and interfere with their election of their own magistrates and other officers. It will be remembered that Lombardy was taken by Charlemagne and united to the Kingdom of the Franks in 773 A. D. The Lombards, supported by the pope, organized a league of cities known as the Lombard League, to oppose Frederick, and they succeeded in defeating him and maintaining their liberties. During the years between 1254 and 1274, no one king was acknowledged by all the German principalities, in consequence of which considerable lawlessness existed. This is known as the period of the "Robber Barons." The country was dominated by feudal lords and many castles were built. In 1274, however, the house of Hapsburg came into power, under which the German principalities were united into one empire.

That the useful arts did not decline during this period of confusion was due to a combination of the gilds of several cities, known as the Hanseatic League, which, in Northern Germany, effected an alliance of the great commercial towns for mutual protection against lawless marauders. The influence of this league was so great that the arts and manufactures proceeded in the towns where it existed without interruption during these turbulent times. At first the League aimed solely to resist the unjust extortions of the feudal lords, to prevent robbery and to stimulate commerce and industry. About the middle of the 14th century it became so powerful that it monopolized the trade of Northern Europe. It maintained armies and navies, made war against and defeated the kings of Denmark, Sweden, and Norway, compelled Edward IV of England to increase its already excessive privileges, and finally became so intolerable that it declined almost as rapidly as it rose.

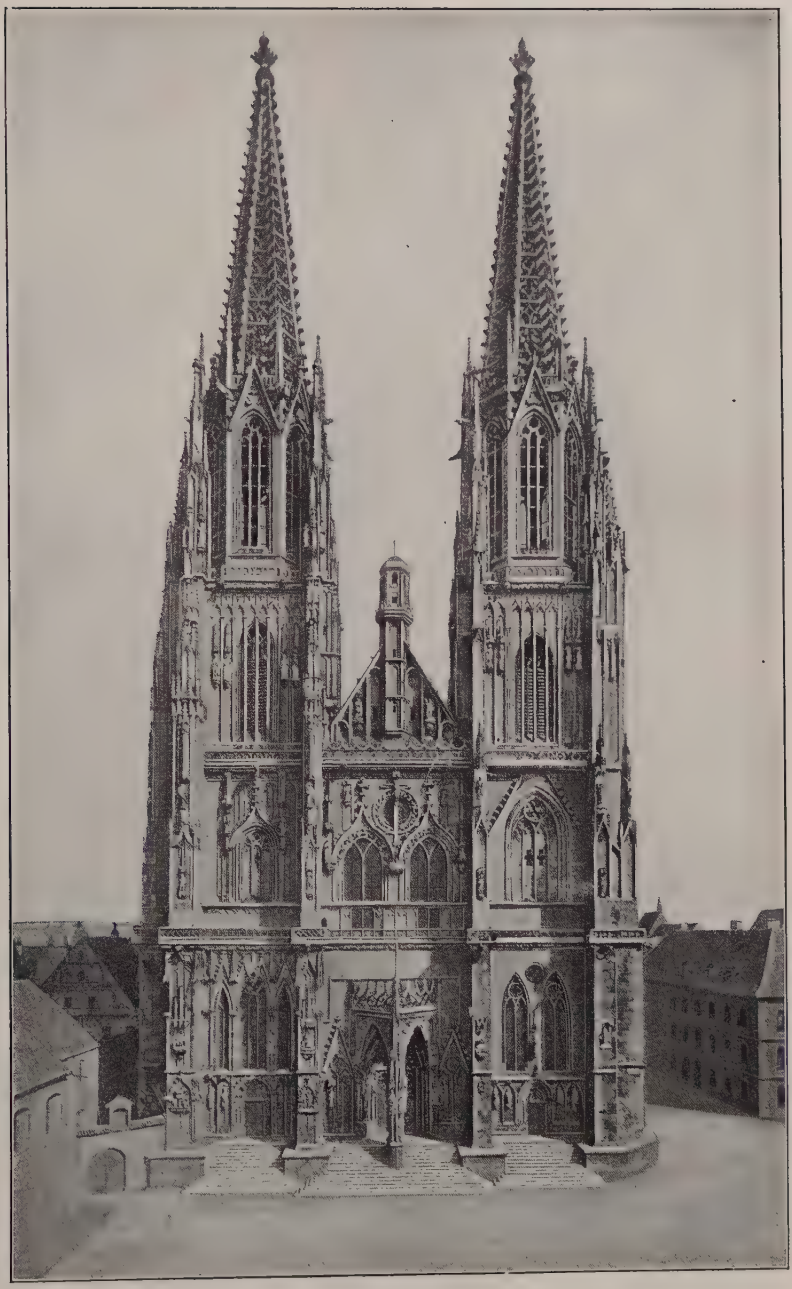
CHARACTERISTICS

48. Gothic architecture in Germany did not develop so systematically and progressively from the Early Romanesque architecture as it did in France and England. In many instances it was borrowed directly from the French style. The Romanesque style prevailed longer in Germany than it did in France, and no Gothic buildings were erected before the 13th century. Gothic architecture was adopted by the Germans at the time when it had attained its highest development in France, but Germany had then adhered so long to the Romanesque style that she could not abandon all of her Romanesque characteristics when she erected her structures in Gothic. As said before, in Northern Germany the lack of building material caused the development of a style in brick, as was the case with the Romanesque style in Lombardy.

The Germans were skilled craftsmen and wood construction is conspicuous in sections where other building material is scarce. Many small buildings were framed of wood and filled in with brickwork between the wooden construction. This was a characteristic Gothic construction, as the woodwork was used to support the floors and roof, while the brick walls were mere screens between the supports, as was the case with the cathedral walls between the aisle buttresses. The exposed woodwork was frequently elaborately carved with intricate designs, as the Germans always tend to complicity rather than originality in design. Even in their stone structures there is much intricate carving, and the spires of the German cathedrals are so elaborately pierced and traceried that they have at a distance the appearance of delicate lace.

Town halls and gildhalls exist throughout Germany, as in the Netherlands, and the German cities united to protect commercial interests, but the influence of these leagues and combinations is not so reflected in the architecture as in Holland and Belgium.

FIG. 30



61

FIG. 31

EXAMPLES

49. Cologne Cathedral.—The plan of the Cologne Cathedral is shown in Fig. 25 (*c*). This edifice presents the finest example of the Gothic style in Germany. It strongly resembles Amiens Cathedral, Fig. 2 (*b*), in plan and dimensions, the eastern end being almost a direct copy. It is the largest cathedral in Northern Europe, being 468 feet in length and 275 feet in width. The choir was completed in 1322, which was 52 years after the building was commenced, but the cathedral as a whole remained unfinished until the 19th century. The nave is very imposing, being 155 feet in height from the tiles to the vaults, and 41 feet 6 inches between the supporting piers. The spires that decorate the western end are characteristic of German Gothic style, being pierced with elaborate tracery, which gives them the appearance of open lacework (see Fig. 30).

50. Ratisbon Cathedral.—Ratisbon Cathedral, erected between 1275 and 1534 A. D., possesses a symmetrical plan with an octagonal apse at the eastern end, instead of a chevet, as in the French plans. The western façade, shown in Fig. 31, was not added until the 19th century. This part of the structure possesses some unusual features, such as the triangular porch in the center and the octagonal lantern over the central gable. The two towers are not symmetrical in the two lower stories, but are alike above, and the spires of lacelike tracery, which is characteristic of the German style, are similar to those of Cologne.

51. Ulm Cathedral.—Ulm Cathedral, Fig. 32, differs from the preceding example in that it possesses a single western tower. This tower is 529 feet high, is richly ornamented with tracery, and presents a solid and substantial design, contrasting strongly with the previous examples. This structure possesses double aisles, over which flying buttresses carry the thrust of the nave vault to the sustaining buttresses at the sides.

63 FIG. 32

ANALYTICAL STUDY

PLANS

52. The plans of the German Gothic cathedrals were a combination of those developed under the early Romanesque style and the adopted plan of the French Gothic cathedrals. The chevet does not seem to have been borrowed as generally as other French details, although it is found in the cathedrals at Cologne, Magdeburg, Lubeck, and Freiburg. Twin towers, with pierced spires surmounting them, exist at the west end of the cathedral at Ratisbon, Fig. 31, and occasionally a single central tower is observed over the intersection of the transepts and the nave, somewhat after the English churches. The entrances are not always found on the west end, which seems to have been characteristic of French and English cathedrals, but are frequently on the north and south sides, as in the Romanesque plans.

WALLS

53. The arcaded galleries under the roofs of the apses, so characteristic of the Romanesque style, were duplicated in the German Gothic period without any apparent thought of their origin or meaning (see Art. **105,** *History of Architecture and Ornament*, Part 2). Tracery was largely employed on wall surfaces, and mullions in the windows frequently divided the openings inside.

ROOFS

54. The roofs were usually vaulted, although wooden roofs existed in some cases. The vaulting was very carefully constructed, and the nave bays were usually square with two aisle bays connecting them. It was not until a later period that the vaulting of oblong bays was attempted, but at Ratisbon, Cologne, and elsewhere, oblong bays became general.

A unique feature of some German Gothic churches is the immense roof, covering at one time and in one span, the

nave and both aisles. This was a typical German system of design known as the "Hall church," and was made possible through the aisles and the nave being equal in height.

COLUMNS

55. In the nave, the main piers are used to support the vaults, as, owing to the great height of the aisles, no attempt was made to introduce semidetached columns.

OPENINGS

56. Double tracery windows are used in later examples, and the tracery was exceedingly elaborate. The characteristic of these openings is the great height; in many cases, two tiers of windows were used because the aisles were very high. In the northern part of Germany, the clearstory starts very low down and is excessive in size, thus presenting a great expanse of stained glass.

ORNAMENT

57. Foliage was treated in a naturalistic way, and boughs and branches were carved in interlacing forms of tracery, which is a characteristic of German carved ornament. The carving itself is usually superior to the design, and the intricate tracery in some of the windows is much more interesting as a technical display of skill than as an expression of grace in outline.

During this period sacrament houses, or tabernacles, were developed in the form of lofty tower-like structures. They were usually built of stone and against the wall, but occasionally they were isolated. The general design was to represent a Gothic spire with pierced-tracery windows and a multitude of pinnacles and canopies, all carried out in miniature. Stained glass and ironwork were elaborately treated, and the diaper work was similar to the French but with German devices instead of the fleur-de-lis. See *History of Architecture and Ornament*, Part 2, Fig. 89 (*d*).

ITALIAN GOTHIC

(1235 A. D. to 1450 A. D.)

INFLUENCES

58. Geographical.—Italy, the home of classic art, was separated by mountain ranges from the nations of Northern Europe (see Fig. 25, *History of Architecture and Ornament*, Part 2). The Bremer Pass through the mountains to Germany was the only means of communication between that country and Lombardy, while Venice had its outlet through its maritime relations with the Orient. It is evident that these different communities, on account of their positions and domestic relations with other countries, must have been subjected to widely different influences.

59. Geological.—Northern and Central Italy supplied abundant and beautiful marbles that were highly prized as wall decorations, and in Florence, Sienna, Genoa, Orvieto, Lucca, and other places, this material was used for this purpose without carving or decorative treatment. Red, black, and white marbles existed in profusion, and, by means of these stones, stripes and panels were introduced into the side walls for decorative effects.

60. Climatic.—This country with its continuous and brilliant sunshine, warm summers, and mild winters, rendered the construction of large openings undesirable. Hence, the windows are low and narrow and the walls are thick, so as to keep out the glare and heat of the Italian summer, a condition that would not lead to the development of window tracery. Decorative treatment in the form of mosaics and frescos shows the influence of the Romans and makes up for the lack of inclination that the Italians showed to construct large windows and fill them with stained glass.

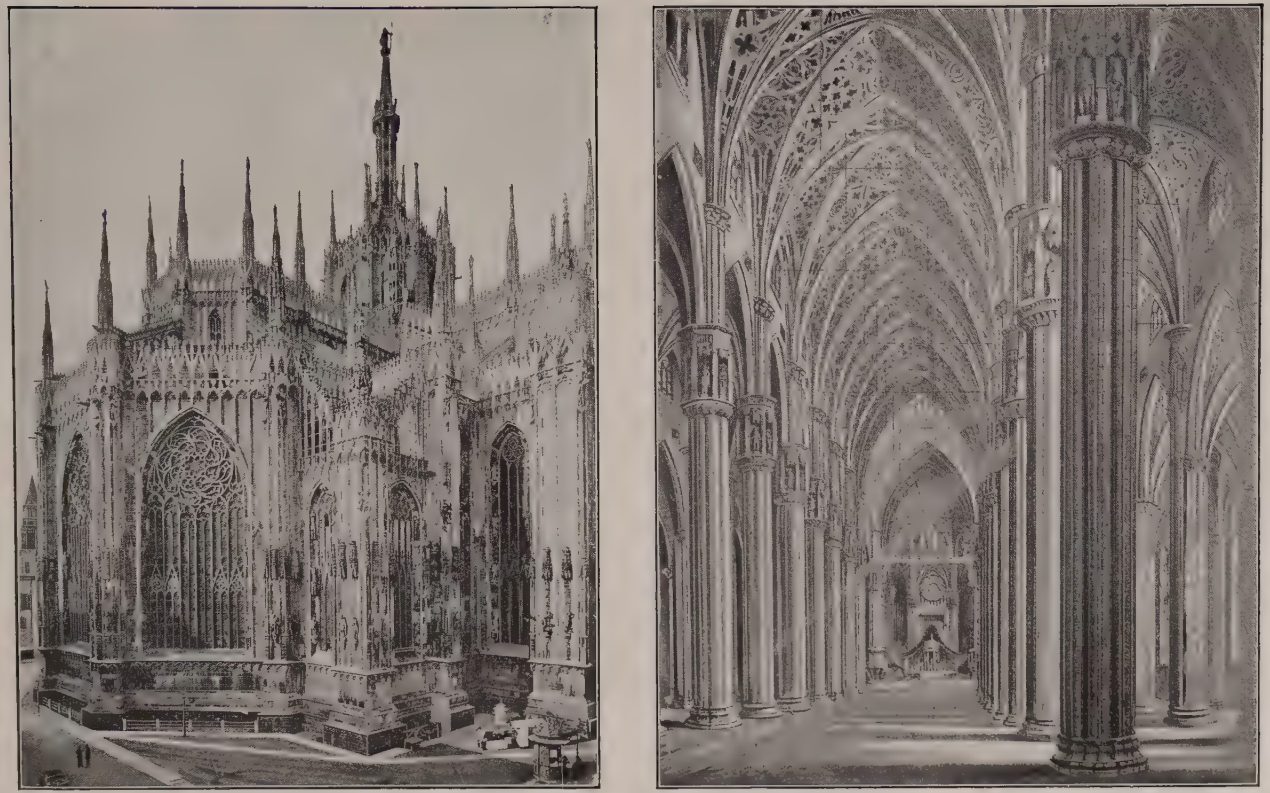
61. Religious.—On the death of Pope Gregory X, in the year 1276, the power of the popes at the head of the Church was lost, and the succeeding popes were under the influence of the king of France. For 70 years they resided at Avignon in France, which is so far from Rome that their authority was scarcely felt there. A rivalry also existed, so that at one time there were two popes, this state of affairs continuing until a settlement was effected by the Council of Constance, in 1415. During the period from 1250 to the beginning of the 15th century, two religious factions were constantly quarreling in Italy and thus materially retarded harmonious development.

62. Political and Historical.—After Charlemagne (see *History of Architecture and Ornament*, Part 2, Art. **71**) several kings succeeded as rulers of Italy, the last of whom being dethroned, Italy fell prey to the ambitions of several feudal lords and was devastated by civil wars, and invasions from Hungary and from the Saracens, until the year 962, when the Holy Roman Empire was again restored under Otho I. The policy of this emperor was to reduce the number and authority of the feudal nobles; to favor the growth of cities and municipal authority; and to reduce the temporal power of the pope by taking part himself in the pontifical elections. This brought about bitter conflicts between the pope and the emperor, which continued throughout the reigns of their successors. In 1155, Frederick Barbarossa, who was elected emperor of Germany, effected a reconciliation and was crowned by the pope as emperor of the Holy Roman Empire. (See Art. **47.**) Italy was divided into small principalities and cities, between which there was great rivalry. The erection of the great cathedrals at Siena, Orvieto, Florence, Milan, and Lucca was due to the pride of these communities and the desire that no neighboring community should excel in architectural construction. Numerous town halls show the wealth of the municipal institutions, and other countries considered Italy the head of arts and science, learning, and commerce.

CHARACTERISTICS

63. The classic forms of construction and decoration that are found throughout Italian Gothic architecture can leave no doubt that this style never had a fair opportunity to develop itself. The high-pitched roofs that characterize the Gothic style in other countries are lacking here. The naves apparently possess flat roofs, and the roofs over the aisles are masked on the exterior behind a screen that hides the slope of the roof behind. There is an elaboration of detail and carved work, but the moldings are flat and unimportant, their place being taken by colored marbles. Buttresses are not treated either structurally or decoratively, and pinnacles, therefore, are not generally prominent. The cornice around the walls is elaborately treated as a screen, and heavy porch projections characterize the entrances. The sculptures are classic in style, and in this respect are preferable to those in Northern Europe, but they do not associate themselves so intimately with the architecture. The capitals are Corinthian in form, and the Roman acanthus is constantly used in the Gothic foliage. Mosaic continues to be seen, as in the Roman buildings, and decorated moldings of terra cotta take the place of carved moldings.

It was during this period in Northern Italy that molded brickwork was developed to its greatest perfection. The Italians used their brick in an original and proper way. The details were small, and the interest, elsewhere developed by great projections and variety of shadow effect, was here attained by variety of color in the brickwork itself. Stones of different colors were used in patterns, giving special character to some of the work. The result, however, is a flatness and want of shadow effect, as there is very little projection to some of the cornices. This, however, was satisfactory to the Italian designers, as they wanted the material to express in the design its own characteristics without interfering with its architectural purpose.



(*a*) (*b*)

FIG. 33

EXAMPLES

64. Milan Cathedral.—In Northern Italy, Milan Cathedral, Fig. 33 (*a*), erected by the first Duke of Milan, is the most important ecclesiastical structure of the Italian Gothic period, but it is not a characteristic building of the Italian Gothic style. It shows great German influence both in character and details. This structure is the largest of the medieval cathedrals, with the exception of the one at Seville, Spain, and it is built entirely of white marble. The roof is flat and is constructed with massive marble slabs laid over the vaulting. The plan, Fig. 34 (*a*), shows a nave with double aisles and a transept crossing the nave and aisles, above which is erected a marble spire [Figs. 34 (*a*) and 35 (*a*)]. A range of immense shafts extends down the nave, and these shafts support the roof vault and give an imposing effect on the interior, as shown in Fig. 33 (*b*). On the exterior, Fig. 33 (*a*), the whole design is expressive of elaboration and lacelike intricacy, but with so little variety that it soon becomes tiresome.

65. Florence Cathedral.—Florence Cathedral, the plan of which is shown in Fig. 34 (*b*), is more characteristic of the Italian style. Solid walls without buttresses, small openings, and unusually wide spacing of the nave arcades characterize the plan. There is no triforium, and the clearstory consists only of a series of small circular openings, which are placed high in the nave wall, as shown in Fig. 35 (*b*). The aisle windows are small and are placed high above the floor, leaving large wall spaces both outside and inside. The walls are thick and present no buttresses on the exterior, although piers are built against the walls on the interior to receive the vault ribs.

The exterior of this cathedral, Fig. 36, is elaborately paneled in colored marbles, and, though entirely devoid of the characteristic Gothic buttresses and pinnacles, it is wonderfully rich and elaborate in design. The dome is not a part of the original scheme, but was added during the

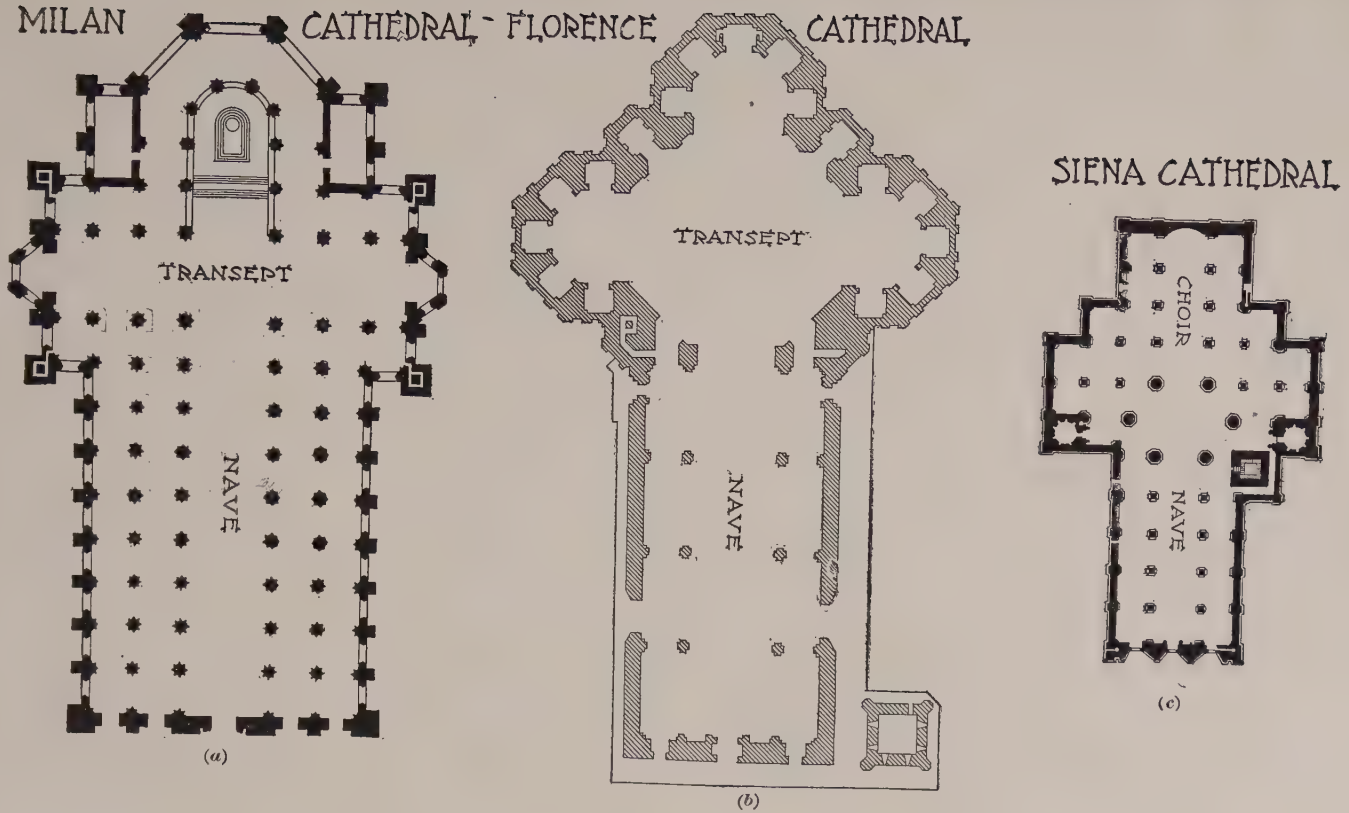
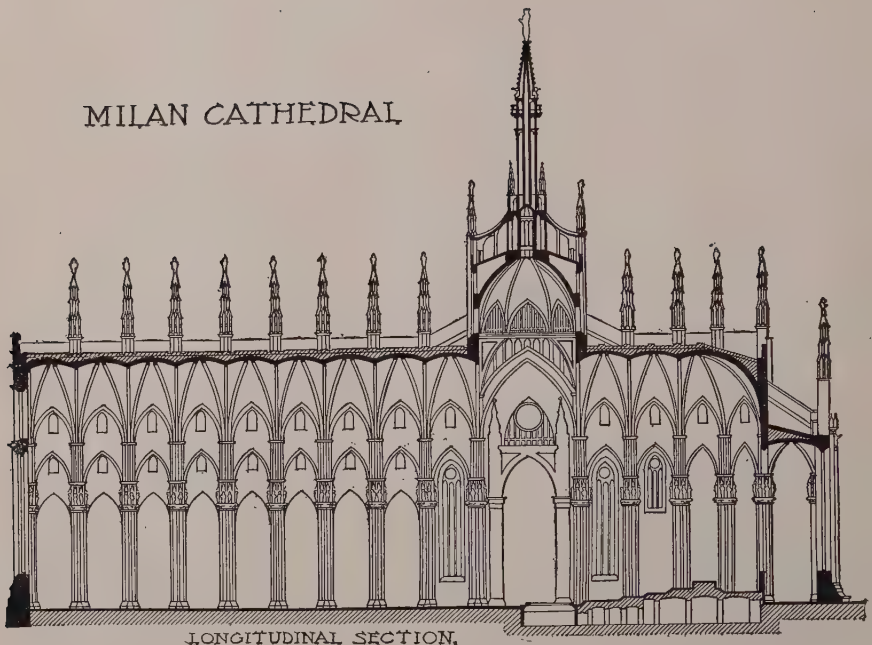

MILAN CATHEDRAL
TRANSEPT
NAVE
(a)
FLORENCE CATHEDRAL
TRANSEPT
NAVE
(b)
SIENA CATHEDRAL
CHOIR
NAVE
(c)

FIG. 34



LONGITUDINAL SECTION.
(*a*)

LONGITUDINAL SECTION.
(*b*)

FIG. 35

Renaissance period, and will be discussed later on. The campanile, or bell tower, adjoining the west front, Fig. 37, is built of red and white marble in four stories, each of which is somewhat higher than the one below, thus producing a feeling of lightness that is augmented by the increased area of the openings in the upper part. The west façade was not completed until the 19th century, but was designed to harmonize with the rest of the building.

Fig. 36

Nothing could show more clearly the vast difference between the characteristics of Gothic architecture of Northern and Western Europe and that of Italy than the façades of the cathedrals. The flying buttresses and elaborately ornamented doorways of France, the wide transepts and long naves of England, and the richly traceried and lacelike spires of Germany are all absent from these Italian compositions, with their symmetrical arrangement of parts and numerous horizontal lines.

66. Siena Cathedral.—Siena Cathedral, whose plan is shown in Fig. 34 (*c*), is another example of wide spacing

Fig. 37

75

FIG 38

of the arcades in the nave; but, here, this is not so extreme as at Florence. A remarkable dome is constructed over an irregular hexagon at the crossing, but not in the center of the nave as in other examples. The walls are heavy and only slightly buttressed, and the windows are small and high above the floor. Its western façade, Fig. 38, is elaborately ornamented with tracery and statuary, but is far different from the façades of Western Europe. This structure is built of black and white marble laid in strips to form geometrical patterns, and is pierced by three great portals of equal size and by a rose window. No continuous perpendicular lines occur in this façade, but numerous horizontal elements prevail. The pinnacles on each side of the central gable are not centered over vertical elements in the first story, but over piers that rest on a horizontal string-course across the front. The portal heads are semicircular, instead of pointed, and are included under low gables embellished with crockets.

67. The wide spacing of the nave arcades gives a feeling of largeness and openness that does not exist in edifices in which the columns are more numerous. The interior of St. Croce, Fig. 39, exemplifies this, and at the same time demonstrates the fact that the appearance of great width detracts from the feeling of depth in the nave.

In Southern Italy the plans were based on the Roman basilica type, but the naves have timber roofs of elaborate design, showing Oriental influences. The pointed arch was frequently used, as in the cloisters of the cathedral at Palermo, Fig. 40. These arches, however, were not molded as in Northern and Western Europe, but were elaborated with mosaic and tile. One of the strongest characteristics of these southern churches was the lavish display of mosaic decoration, in which portraits of biblical characters were executed in a crude, archaic style, and surrounded with borders of arabesque designs in gold and color. The lower walls were sheathed with white marble, with bases and borders of green and purple porphyry.

FIG. 39

ANALYTICAL STUDY

PLANS

68. The influence of Roman antecedents is clearly shown in the plans of the Italian Gothic style. Here an endeavor is made to create a great central court in the churches, as at Florence and Siena Cathedrals, Fig. 34 (*b*) and (*c*). The nave bays are usually set out in square compartments, while the aisles are in oblong compartments, thus reversing the practice of Northern Gothic. Externally, a dome is found introduced, as at Siena and Florence, a detail that never appears in Northern Europe.

WALLS

69. The use of small windows set high above the floor leaves vast wall spaces unbroken by buttresses, as these walls were heavy enough to withstand the thrust of the roof members without such assistance. Their omission, however, destroys the tendency to vertical lines in the façades, and a lack of shadow effect results. There is no attempt to emphasize the construction in the decorative treatment of the walls, the façades being treated independently of the roofs and other structural details behind them. Variety in light and shade was attempted by facings of marble in horizontal bands of two colors, in contrast to the Northern Gothic, which attained a light-and-shade effect through the introduction of buttresses and other vertical elements.

On the interior of the cathedrals, the triforium was usually omitted, as at Milan and Florence, Figs. 33 and 35. The clearstory then became little more than a spandrel of the nave vault pierced by a small, and usually circular, window. The arrangement of these arcades, with their widely spaced supports, gave the interior the appearance of a large hall, as in Fig. 39, rather than of a long nave, as in the Northern Gothic.

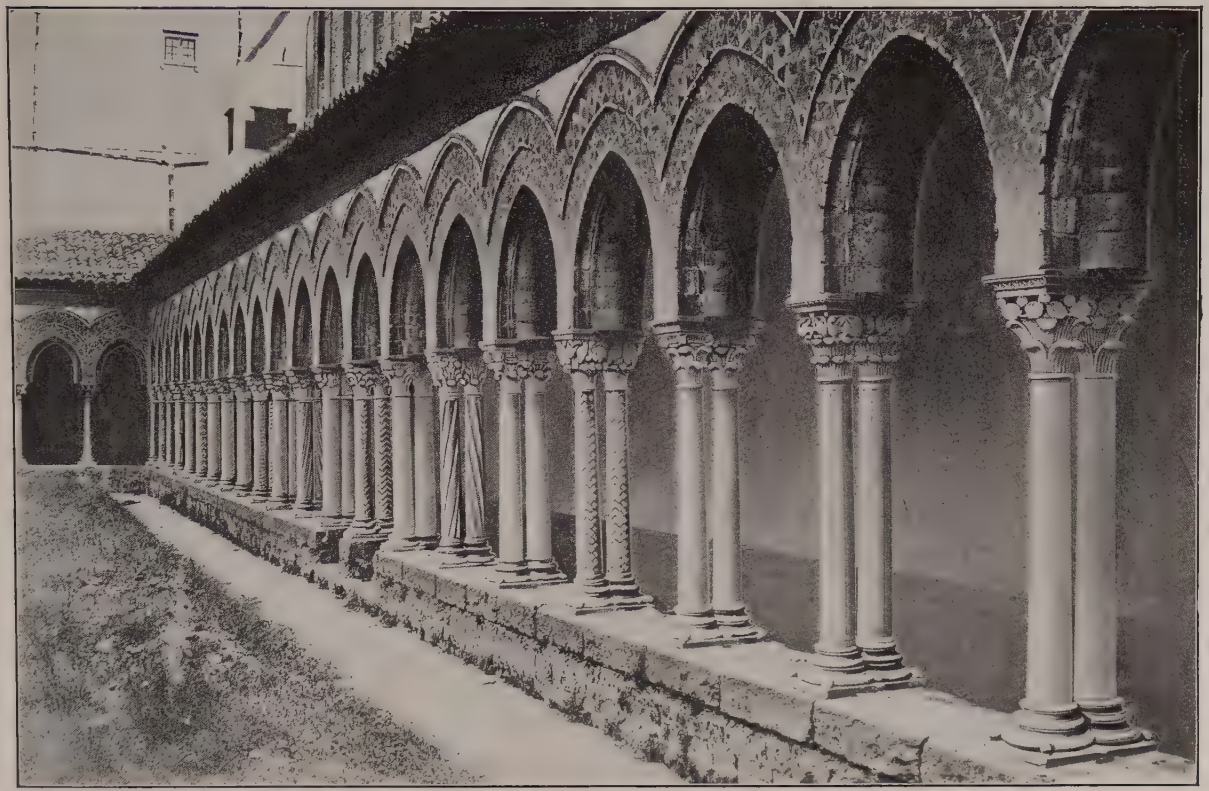


FIG. 40

ROOFS

70. The structural details of the roof form no part of the design scheme. The roofs are usually low, as the climate does not require a steep pitch, and they are therefore hardly visible from the streets. The end gables, when they exist, are somewhat masked behind high screen walls richly ornamented with tracery or encrusted with marble mosaic.

COLUMNS

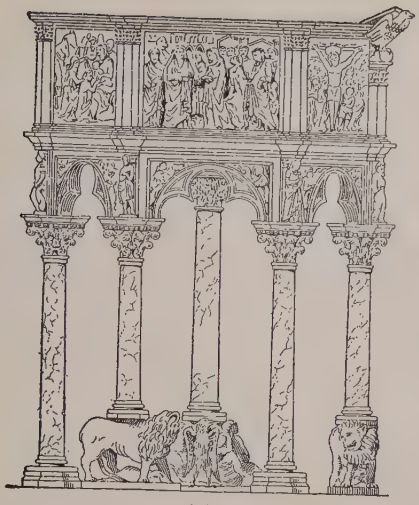
71. The nave piers of the churches are singularly clumsy and inelegant. Square piers composed of four pilasters set back to back are frequently used, as are also heavy round piers with Corinthian capitals and classic bases, recalling Roman influences. These were widely spaced so that the long perspective effect characteristic of the naves in Northern Europe was never attained.

OPENINGS

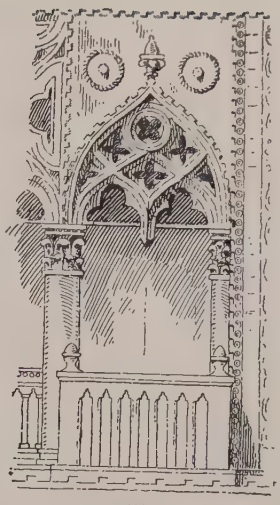
72. The windows are rarely pointed as in the northern cathedrals, because the formation of the vault did not require it. Semicircular heads are more prominent, and some openings are simply closed over with a lintel. When the pointed arch was used, it was frequently designed with a deep-molded keystone, a method borrowed from the semicircular arch of the Romans, but having no real significance in the Gothic style, as with the pointed arch a keystone is not required.

MOLDINGS

73. Roman models were used for the moldings, but with less variety, as colored marbles gave the necessary horizontal elements where required and vertical elements were not in much demand. Molded elements were always subordinate to surface decoration.



(*a*)



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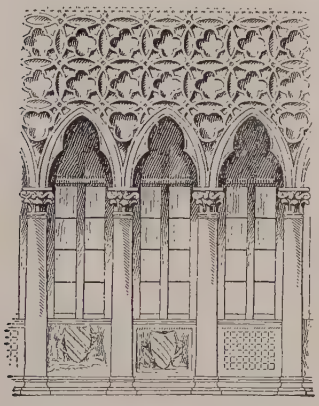

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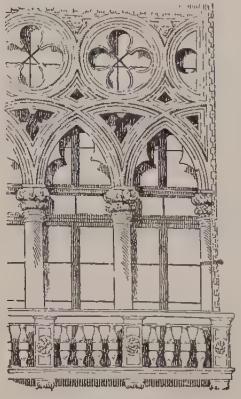
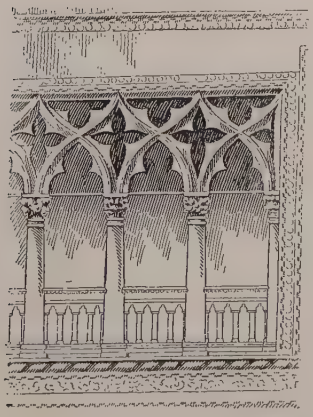


(*d*)



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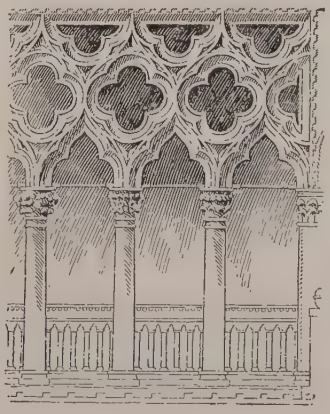


(*f*)

FIG. 41

ORNAMENT

74. During this period, the art of the fresco painter was greatly developed and led to the perfection attained in wall decoration during the succeeding period. Many buildings were erected devoid of all manner of wall treatment, and depended entirely on fresco details for decorative effect. In carved work, the traditions of ancient Rome prevented such extremes of grotesque as characterized Western Europe; but in the execution, more attention was usually given to accessories than to the general design. On the altars, tombs, and pulpits, carving and mosaic work were lavished unstintingly, as shown in Fig. 41 (*a*), and further ornamental work was attained in the colored marble veneers of the façades and the marble mosaic of the pavements. Traceried screens [Fig. 41 (*b*) to (*f*)] were a prominent characteristic of the palaces and other secular buildings (Art. **91**).

This tracery is particularly characteristic of the Venetian Gothic, and though based on no such structural conditions as the tracery work in England, it is delightful in its intricacy of detail. The façades of the palaces of Venice being limited to straight water fronts would necessarily be tame and uninteresting were it not for this local system of design that introduces strong contrasts of light and shadow to relieve the rectangular elevations. Land was too scarce to permit of strong breaks in the façades or the grouping of the masses of a building into principal and subordinate parts. The climatic conditions were not favorable to large openings to relieve the broad frontages, and the narrowness of the canals demanded a treatment that invited close inspection. The elevations were therefore designed to consist of recesses and balconies behind rich traceried screens consisting of the pointed arch between columns, as in Fig. 41 (*b*) and (*c*), or of intersecting semicircular arches extending over alternate columns, as in (*d*). The tracery work sometimes consisted of pointed arches, between which the superimposed wall was pierced with quatrefoils, as at (*e*) and (*f*).

SPANISH GOTHIC

(1230 A. D. to 1450 A. D.)

INFLUENCES

75. Geographical.—Spain, Fig. 42, is a peninsula in the southwestern part of Europe. Mountain ranges divide the country into several sections that were peopled by rival races and were almost constantly at war. Andalusia, until

FIG. 42

the close of the 15th century, was held by the Moors, who were Mohammedans. Their kingdom was surrounded by a wall of mountains and contained a wondrously fertile plain, the finest in the entire country. Andalusia originally

included all of Spain south of the Duero and Ebro Rivers and the Guadarrama Mountains. After the capture of Toledo by the Christians, at the end of the 11th century, the Moors were confined to the extreme southern part of the country.

76. Geological.—Stone was generally employed in Spain, although granite and marble were also used. The Moors used rubble work with brick bonding, and remarkable effects were obtained.

77. Climatic.—The climate of Spain varies materially, according to the elevation. Burgos, in the north, is 3,000 feet above the sea and is exceedingly cold at times, while a portion of the south, particularly along the Mediterranean Coast, is tropical.

78. Religious.—Constant warfare with the Mohammedan Moors effected a feeling of unity between the Christians of Spain, and thus gave the Church great power. The cause of the wars was the hatred toward the Moorish race, as well as the opposition to the Mohammedan religion. It was fortunate for society that the Church had such influence in that barbarous age, for at that time the priest and the monk together established the outward order and the inward life of the world. In fact, they often had greater authority than a chief or a king. The cathedral and the monastery were centers of power for good. There the ignorant were taught, the helpless protected, the poor sheltered, and the starving fed. The monasteries also served as the hotels of the day, and hospitality to travelers was a chief duty. The Church, too, knew no distinction of rank or class. A slave might become a priest, a priest a bishop, a bishop a pope. Especially was this influence of the Church of value when there was no uniform law to supreme civil authority, and when invasions and civil wars were constantly filling the world with violence, bloodshed, and desolation.

79. Political and Historical.—When the Romans left Spain, the Vandals of the African Coast took possession, after which the country was invaded by the Moors of North Africa,

and for 800 years their influence was continuous. Their constructions, which still remain at Cordova and Granada, express the richness of their architecture in an exuberance of intricate detail in which the rich color effect is remarkable.

In *History of Architecture and Ornament*, Part 2, Arts. **36** to **38**, mention has been made of the rise of the Mohammedan tribes and their invasion of Western Europe. The Moors were a branch of these Mohammedan tribes, and although they invaded Southwestern Europe as far as Tours in France, they were driven out by Charles Martel and confined to the Spanish peninsula.

The beginning of the 11th century found the old Mohammedan Dominions in Northern Spain divided into the Christian states of Castile, Leon, Navarre, Aragon, and Portugal, and all these states were united in the endeavor to drive the Mohammedans into Andalusia. The kingdoms of Navarre, established in A. D. 873, Castile 1026, Aragon 1035, Leon 1037, etc., soon united under the banners of Castile and Aragon, while Andalusia was still held by the Moors. After the capture of Toledo (the Moorish capital), in 1084, and the battle of Tolosa, in 1212, the Mohammedan influence gradually declined. Under Ferdinand III, King of Castile and Leon, Seville and Cordova were taken, 1217 to 1252, and Gothic art took root and grew, assisted by the wealth of the conquered Moors. Through the marriage of King Ferdinand, of Aragon, and Queen Isabella, of Castile, all the small kingdoms except Andalusia were united in the single kingdom of Spain. Ferdinand and Isabella, both ardent Christians, commenced a vigorous campaign against the Moors, during which the King and Queen, together with the entire court, moved with the army, thus carrying royal wealth and influence into the southern provinces. In 1491, when Granada, the last stronghold of the Moors, fell into the hands of the Christians, the entire peninsula of Spain came under the rule of a single sovereign.

Joanna, daughter of Ferdinand and Isabella, married Philip, son of Emperor Maximilian, of Germany, in 1496, thus making Spain a part of the great German empire.

CHARACTERISTICS

80. In Southern Spain, Gothic art was always more or less under Moorish influence. The early churches of the Spanish conquerors seem to have been executed entirely in Moorish art. This influence is expressed in the introduction of Mohammedan details, such as the horseshoe arch and the pierced tracery of Moorish design. The window openings are entirely filled by intricate fretwork screens, which are rich in detail and elaborate in design. In other places, Gothic buildings are decorated with intricate geometrical surface ornament, in which foliated forms are introduced, thus distinguishing them from the Moorish designs in which no animal or vegetable forms were used. The Gothic style was best developed in the extreme north, where French influences were felt.

Leon Cathedral was modeled after Amiens, but exceeds it in the expanse of window openings. Broad surfaces and horizontal lines, derived from Roman influences, characterize Spanish art the same as they did Italian art, but the clear-stories in many of the Spanish cathedrals are characteristic features.

The average inhabitant of Spain was indifferent to plastic art, the national artistic talents being limited to music. It mattered little to him whether his church was Gothic or Romanesque, so long as it was dedicated to his favorite saint. Spain developed no architecture of its own. All is borrowed. Byzantine grotesque and Moorish arabesque are inherited from the Goths of the North and the Moors of the South. The magnificence displayed in the cathedral interiors is due to the Oriental spirit that still throbbed in the veins of the country, as the Moors inhabited Southern Spain for 800 years.

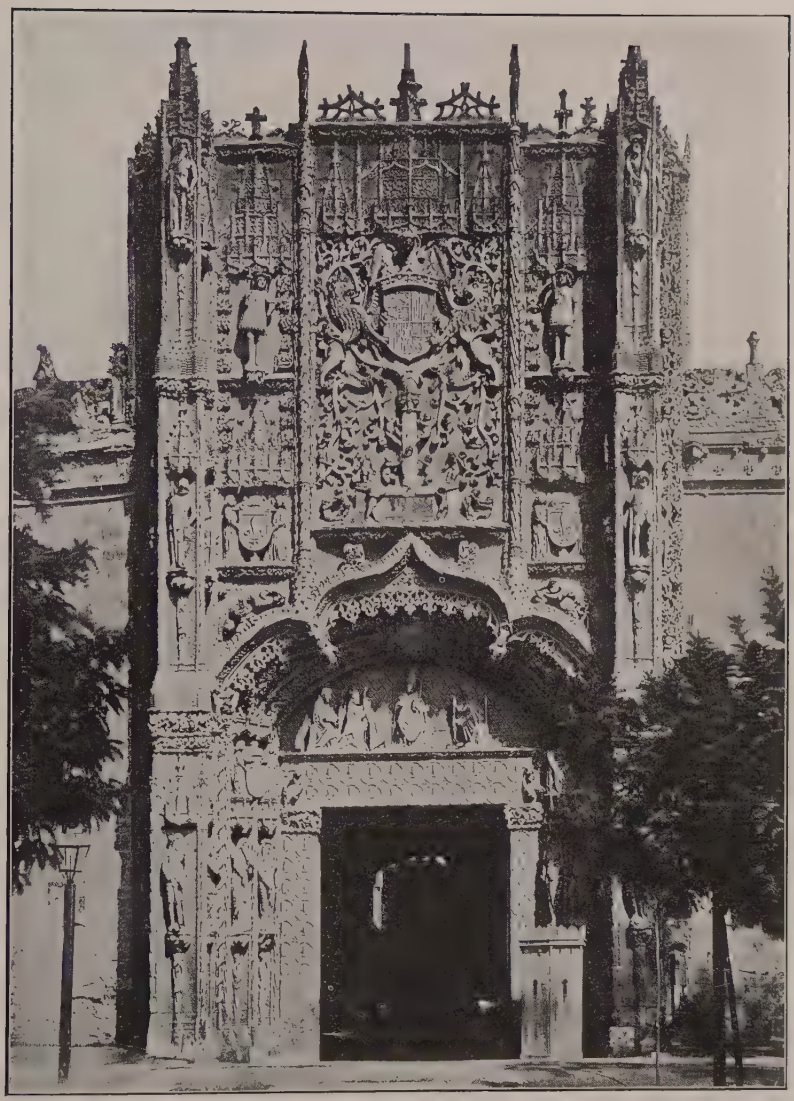
87 FIG. 43

EXAMPLES

81. Burgos Cathedral.—Burgos Cathedral was built at the instance of an English bishop and had a French model as its prototype. The former influence may account for the magnificent lantern at the crossing, while the latter may have governed the plan. The plan presents a Latin cross with nave, aisles, and transepts, but owing to additions on all sides, except the west front, the plan has become very irregular and unsymmetrical. The original transepts projected only slightly, and the aisle was carried around the east end, forming a chevet. Beyond the chevet, chapels were arranged that materially affected the exterior design.

The interior of this cathedral, Fig. 43, is a view down the transept toward the south end, and shows the massive piers that support the great octagonal lantern over the crossing. The florid ornament, the richly carved canopies containing effigies of the saints, and the intricate traceries are all characteristic of the Spanish Gothic. The effect of the lantern itself is somewhat like a tall dome whose walls, supported on pendentives, are pierced by lancet windows and entirely covered with an intricate arrangement of sculptured arabesques, statues, ribs, and small columns. The ornamentation is as crowded as the leaves of a tree, and though the structure is gigantic in its proportions, it is as delicate as a piece of filigree.

82. Cathedral of St. Gregorio.—The entrance to St. Gregorio Cathedral, at Valladolid, shows the effect of Moorish influence on Spanish design. The decorative detail, as in all Spanish examples, is elaborate and minute, the carving being extremely lacelike in its delicacy; but there is no suggestion of structural conditions—no architectural significance of the ornamental details. The portal shown in Fig. 44 is an example of florid Gothic ornament, rather than of Gothic architecture. Strip the ornament from this edifice and the architectural condition would remain unchanged. Yet, withal, the effect commands admiration



89 FIG. 44

by its beautiful intricacy and the patient devotion of the sculptor to the glorification of his religious ideas. Here, ostentatious display of details contrasts with the devoted simplicity of the Northern Gothic, but both are the outward expression of the same sentiment from two widely different races of people.

83. Segovia Cathedral.—Segovia Cathedral, Fig. 45, although erected in the early part of the 16th century, adopted the wide nave and the semicircular chevet of French origin. The nave demands strong buttresses to withstand the thrust, while the chevet introduces that characteristic east end with radiating flying buttresses, as in the French cathedrals. There is more structural detail and less intricate ornamentation on the exterior of the Segovia Cathedral than in many other Spanish examples, and therefore more Gothic feeling, although the construction dates from the Early Renaissance period. The hemispherical dome over the square tower at the crossing and the dome over the western tower are in no way harmonious with Northern Gothic ideas, but the strongly marked buttresses with paneled sides and numerous vertical elements are similar to later Gothic treatment in other parts of Europe. Such is the case with nearly all examples of Spanish Gothic architecture. The style does not possess sufficient originality to be national in development, nor has it borrowed sufficiently from any source to be classed entirely with any foreign development. The Moorish surroundings affected much of the detail in some localities, while in others the cathedrals were built on the sites of ruined Mohammedan mosques. Such was the case with the Cathedral of Seville, which is the largest medieval cathedral in Europe. It bears some resemblance to Milan Cathedral, but its exterior is not pleasing and its skyline is monotonous. Its plan includes a nave and double aisles with side chapels as in other cathedrals, but its proportions have no precedent in Christian architecture, as it was built to fit the space occupied by the previous mosque.

Fig. 45

ANALYTICAL STUDY

PLANS

84. The plans of the Spanish cathedrals are wide in comparison with the length. The choir is usually west of the crossing. The dome over the crossing is similar in treatment to examples found in Southern France. Traceried, open spires surmount the towers at the west end, similar to these details in Germany.

WALLS

85. The walls present an inclination toward French ideas, and in late examples, extreme florid ornamentation characterizes their treatment.

ROOFS

86. The roofs were vaulted, but vaults were developed in decorative rather than in constructive features. The traceries, bosses, and vault ribs are rich in effect, although the composition and design cannot compare with the English vaulting in interest.

COLUMNS

87. The lantern at the crossing emphasized the central piers, as at Burgos, where they are circular in plan and very massive. The columns, in Seville Cathedral, were great piers for supporting the arcades, and the carved capitals, in characteristic form, were introduced in pairs.

OPENINGS

88. The openings were large and numerous, and the triforium was sometimes glazed, as was also a part of the wall surface of the clearstory. Stained glass was extensively used.

MOLDINGS

89. Spanish moldings were based on French ideas with the introduction of local motifs. They are lacking in refinement of conception, as are all details of Spanish architecture. In a few isolated cases, the moldings are well chosen and well placed, but these are exceptions, and are in no way characteristic of the Spanish style.

ORNAMENT

90. In the Spanish churches, the reredos, or screen behind the altar, was richly ornamented, being often as wide as the nave and reaching to the vaulting. It was usually constructed of stone, and was treated with canopies and niches containing figures, elaborate paneling being placed between. The painting was naturalistic, and the gilding was applied so solidly as to give the effect of real metal. Much sculpture, frequently life-sized figures, was introduced, and stained glass, heavy in style and gaudy in colors, and elaborate grilles in hammered and chiseled iron bars relieved by figures beaten in repoussé were also employed. These iron grilles, called *rejas*, form one of the most characteristic details of the Spanish style.

On the exterior, numerous sculptured figures were introduced, and these were intermingled with heraldic devices and running ornament until the panels of the walls were completely filled with decorative treatment. An excellent example of this is shown in the door of Valladolid Cathedral, Fig. 44.

A characteristic of Spanish art is the demand for realism, no matter how inappropriate it may be. Simple sculpture is not sufficient, and as a result the statues are colored and frequently dressed in real clothes. As a result of this tendency, many of the sculptured figures of Spain look like waxwork, and the skill of the plastic artist is hidden beneath the draperies.

REVIEW EXERCISES

1. Describe the contrasting characteristics of the French and English cathedral plans and state why the general system of planning is less uniform in France than in England.

2. (*a*) What characteristics of the cathedral interiors is peculiar to France more than any other country? (*b*) What contrasting characteristics distinguish the interior effects of French and English cathedrals?

3. (*a*) Why are flying buttresses more prominent in France than in England? and (*b*) wall buttresses more prominent in England than in France?

4. What are the contrasting characteristics of French and English cathedral roofs?

5. What are the contrasting characteristics of French and English (*a*) nave columns? (*b*) doorways? (*c*) window tracery?

6. What are the characteristic Gothic structures in the Netherlands?

7. What peculiarity concerning the entrances of German cathedrals are characteristic of that country?

8. What (*a*) climatic; (*b*) geological; (*c*) religious; (*d*) political influences affected the character of Italian Gothic architecture?

9. (*a*) What are the characteristics of Italian Gothic architecture? (*b*) What are the contrasting characteristics of Italian Gothic and other Gothic cathedral plans?

10. In what way does the roofing system affect the Italian Gothic style?

11. (*a*) What part of Spain was occupied by the Moors up to the end of the XI century? (*b*) What are the natural boundaries of this section?

12. What foreign influences affected the Spanish Gothic style?

SECULAR ARCHITECTURE

INTRODUCTION

91. As cathedrals were the first important structures of the middle ages, during which Gothic construction and ornamentation were developed, the studies thus far have been confined to the development of the Gothic system in these buildings. As a matter of fact, however, every building that was erected in Western Europe throughout the 13th and 14th centuries was in the Gothic style. Among these were the feudal castles, which were first erected as fortresses and afterwards developed into residences, and the great gildhalls and municipal buildings erected by the craftsmen and citizens of the growing municipalities. The architecture of these buildings varied in different localities, just as that of the cathedrals did, but their importance architecturally is increased by their consideration as monuments of utility designed to suit the demands of different purposes. All cathedrals were erected for one purpose, and all cathedral plans presented the same general arrangement. Moreover, these plans are the one detail that did not originate in the Gothic or the Romanesque style. The nave, aisles, transepts, and choir are all inheritances from the old Roman basilica.

Cathedral building was progressive, but wholly in a structural sense. The problem in all countries was practically the same: To cover with a stone roof a long narrow plan and to do this with the greatest economy of material. The feudal-castle plan, however, was always irregular to conform it to the hill on which it was built; and economy of material was impractical, as the defensive walls must needs be of immense thickness. Planning and construction, therefore, developed along different lines in these secular buildings.

MILITARY AND DOMESTIC ARCHITECTURE

92. The castles and residences of the nobles formed an important part of the architecture of the middle ages, and established details and peculiarities of plan that reflected the social conditions of the times and that have been retained in a more or less modified form down to the present day. (See *History of Architecture and Ornament*, Part 2, Arts. **45** to **47**.) Though these castles were primarily military posts, they were at the same time the official residences of the lords or barons that governed the fiefs, and while they were built in accordance with the medieval ideas of defense, their planning is expressive of the feudal relation of the vassal to his lord, who exacted the vassal's services and therefore maintained him.

93. In the 12th century, the principal features of the castles consisted of a large outer court, or *bailey*, containing the stables and storehouses, and an inner court. This court was either partly or entirely surrounded by the various apartments of the castle, Fig. 46, all of which was surrounded by a high wall with a parapet and ramparts at the top, while a deep, water-filled moat, or ditch, surrounded the base. The moat was crossed by a drawbridge that could be raised when not in use, and the entrance to the courts was effected through a fortified gateway, which was protected when closed by a huge iron gate, or *portcullis* that could be raised and lowered in grooves like a window sash [see Fig. 59 (*b*)].

The castle proper surrounding the inner bailey consisted of a number of apartments. The principal one was known as the *great hall*, which was the main living room of the castle, where all meals were served, where all business was transacted, and where such amusements and pastimes as the age afforded were indulged in. The keep, or *donjon*, a fortified tower several stories in height, was entirely surrounded by a water-filled moat. This tower was the final place of refuge in time of siege and the last point of defense when

WING OF FRANCIS 1ST.
REBUILT IN XVI CENTURY.
GREAT HALL
XIII CENTURY
COURT
CHAPEL
PLAN OF THE
CHATEAU AT BLOIS
(b)
COURT
CHAPEL
GREAT HALL
DONJON
PLAN OF THE
CASTLE OF COUCY.
(a)

Fig. 46

all other towers surrendered. Around the outside of the keep, supported on projecting corbels, was a parapet wall, the floor behind which was pierced between the supporting corbels with openings, through which the besieged could either shoot, or pour boiling oil, molten lead, etc. on the besiegers below. These openings, called *machicolations*, were a characteristic detail of the towers of every feudal residence.

In the earliest days, the castle was heated by means of an immense fire-grate located in the center of the room, the smoke from which passed through openings in the roof, called *louvers*. In the 13th century, however, fireplaces were erected at the sides or ends of the rooms, and the smoke was carried off by means of chimneys.

94. In the 14th century, the great hall was divided into two apartments, one of which was known as the *withdrawing room*, where the lord and his family could retire after meals, but the hall was still retained for business and dining purposes. Sleeping rooms, when introduced, were often dark, cheerless apartments, and were designated by the term *chamber*, a word derived from the Latin, meaning a dark vault.

With the growth of the royal power, the fortifications became a less prominent feature, as the danger of petty wars between the nobles was decreased. In the 15th century, the plans of the castles became more regular, generally rectangular in outline, but they still retained the inner bailey, or court, as in Fig. 46 (*b*). These details developed differently in different countries, but the general characteristics prevailed throughout.

95. The early castles were usually located on the top of a hill, with the ground sloping away from all sides but one, and on this one side was the principal entrance. On the lower slopes of the hill was the town, or *cité*, as it was called, where the vassals of the nobleman grew their vines and plied their trades; but they held their various pieces of land subject to the rule and under the tenure or lease of the lord of the castle. Frequently, the cité itself was surrounded by a fortified wall, and the castle was erected as a stronghold

within. The lord, in his turn, held his estate, or fief, subject to some higher political power, as a duke, or even the king, and his failure to comply with the demands of his superior would usually bring down a war upon his shoulders and necessitate the calling of all his vassals to the defense of the castle. These petty wars were frequent and generally resulted either in the partial demolition of the castle or in its entire subjugation and the passing of the fief into the hands of the enemy.

In either case, the vassals were compelled to assist in the repair of the damaged castle walls. Each time this rebuilding became necessary, some more or less important change would be made in the construction, owing to experience gained with each war. Consequently, the architecture of these castles was rapidly progressive, until the use of gunpowder in warfare rendered the castle system of defense practically useless. None the less, the castle was the earliest form of nobleman's residence, and therefore the prototype of the modern mansion. Long after fortified residences became obsolete, the castellated form was used even for a city residence, and as late as the middle of the 15th century many prominent features of both plan and elevation strongly resembled those of the days of the feudal system.

This was in many cases due to the fact that a more modern building was erected over the foundations of the old feudal residence. The plan of the Château at Blois, Fig. 46 (*b*), was necessarily irregular on account of the site on which the castle was erected, and this irregularity was retained when in the 14th, 15th, and 16th centuries the three wings were successively rebuilt on the foundations of the older edifice. Other castles were not even rebuilt, but were simply remodeled within the old walls, thus retaining many characteristic features that advancement in domestic conditions had rendered obsolete.

The following examples have been selected as illustrating the characteristics of the Gothic style of residence, but several of them were erected after the Gothic style had been superseded by the Renaissance.

EXAMPLES

CASTLES AND CHÂTEAUX

96. Bodiam Castle.—In Fig. 47 (*a*) is shown Bodiam Castle, in England, with its surrounding moat. The square tower was used more in England than on the Continent. The walls were usually crowned with the indented parapet all around, while the machicolations were generally confined to the towers. The openings in the walls were simply narrow slits through which bolts and arrows could be fired from bow guns and arbalests, but were too small to serve as targets for the besiegers.

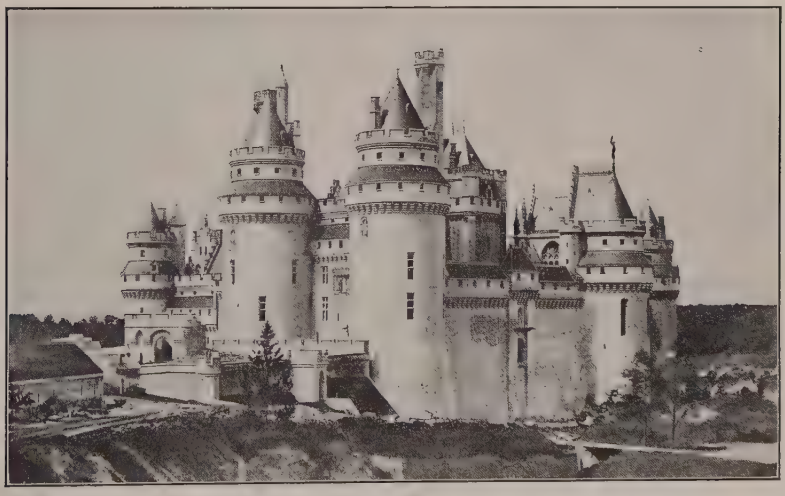
97. Château Pierrefonds.—The Château Pierrefonds, in France, Fig. 47 (*b*), presents the typical French form of structure, although the large windows are of a later date. The circular towers at the angles and the machicolations around them and along the curtain walls may be found in nearly all the châteaux of feudal France.

As the middle-age nobleman began to take more interest in domestic architecture and details of planning were introduced that tended toward greater domestic comfort, he remodeled his feudal stronghold to suit the new conditions, and the result is seen in the irregular and picturesque Gothic château. The architectural development of the fortress châteaux during the Gothic period shows a growing beauty and richness of both form and detail. Luxurious Gothic ornament was lavished on halls and interior courts; also, dormers, pinnacles, and grotesques were numerous on the exterior, and produced the picturesque broken sky line that was characteristic of all Gothic work.

There were many of these magnificent structures in France, but the majority of the most important ones have been either destroyed or entirely remodeled. Château Pierrefonds probably presents the best of the early examples.

The date of the earliest construction at Pierrefonds is lost in obscurity, but there is a record of its having been

(*a*)



(*b*)

FIG. 47

reconstructed, and that it was an unpretentious structure when it came into the hands of the king, about 1185 A. D. Louis of Orleans received it from his brother, Charles VI, and began to remodel it in 1398. Feudalism at that time was still a power in Europe, and Pierrefonds as it stood when finished, in 1406, was a thoroughly medieval fortress, built at the time when Gothic architecture had reached its greatest degree of perfection.

98. The plan included the characteristic inner court, upon which the principal living apartments opened. The exterior walls were plain, and presented few openings. They were of enormous thickness and were protected by eight massive circular towers, which were crowned with conical roofs.

The towers and walls were both machicolated and battlemented, with loopholes between the embrasures of the battlements. The main entrance was protected by a moat and a walled court and was closed by a portcullis. All the walls, except the court, rise from the edge of a steep bluff.

The façades on the quadrangular inner court are less military in appearance. The windows here are larger, and traceries and foliations are prominent in their design, as shown in Fig. 48 (*a*). Numerous dormer-windows are surmounted by crocketed gables and finials, and a traceried balustrade stands above the cornice. These, with grotesque gargoyles, heraldic animals, and richly carved moldings, combine to produce a most imposing architectural composition.

In front of the main staircase is a bronze equestrian statue of the founder, the Duke of Orleans, and opposite, on the right, is the entrance to the chapel, with an elaborate rose window over the door. The inner court, from which a grand stairway usually leads to the several floors, became characteristic of French châteaux, and later governed much of the domestic architecture throughout France.

99. As the style advanced, the soaring character of the Gothic structures became more marked, and high-pitched roofs with elaborately gabled dormers were introduced.

(*a*)

(*b*)

FIG. 48

The elevations became more symmetrical and the windows were arranged with more regularity, as shown on the inner court of the Château Fontaine Henri, Fig. 48 (*b*).

100. Hoensarzburg Castle.—The castle of Hoensarzburg, in Germany, Fig. 49 (*a*), shows the elevated position chosen for these edifices in order that they could command an extensive view of the surrounding country and thus guard against a surprise attack.

101. Fortified City of Carcassonne.—Among the fortified cities, Carcassonne, in France, Fig. 49 (*b*), presents about the only example now in existence. It has a double line of fortifications composed of fifty towers with curtain walls between, and a dominating citadel within. These fortifications date back to the 5th century, but were frequently altered or reconstructed up to the 14th century. After that they were allowed to fall into ruin until the middle of the 19th century, when they were restored as nearly as possible to their original form by the French government architect.

This class of Gothic architecture has been borrowed in modern design for armories and government buildings, forming parts of plans of defense.

102. Château at Blois.—The most celebrated of these châteaux is the one at Blois, France, not only on account of its historical associations, but also on account of its architectural development. Blois never was of much importance until 1498, when Louis XII, who was born there, became king of France. Blois then became a royal château. Louis XII, in the early part of his reign, rebuilt a portion of it, and the wing bearing his name, Fig. 50, presents one of the daintiest compositions in Gothic domestic architecture.

This château was built around the characteristic inner court, and faced on a large, open, outer court, as it was erected on the lines of an old feudal castle. The façade on the outer court, Fig. 50, consists of two stories, black and red brick being arranged to form a checker pattern. The windows are trimmed with light stone, which is laid with

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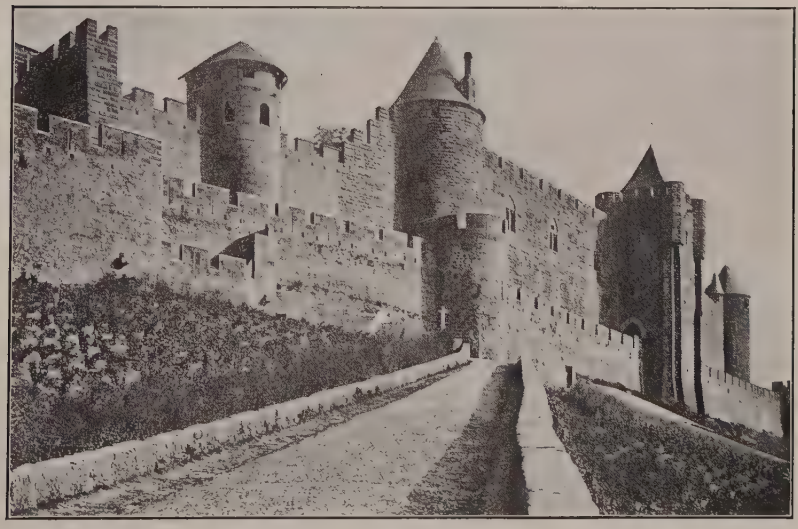


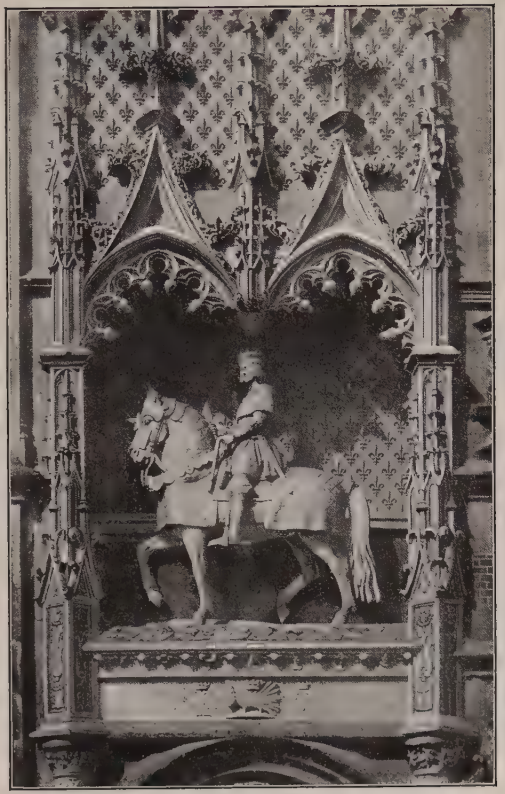
(*b*)

FIG. 49

FIG. 50

Fig. 51

(*a*)



(*b*)

FIG. 52

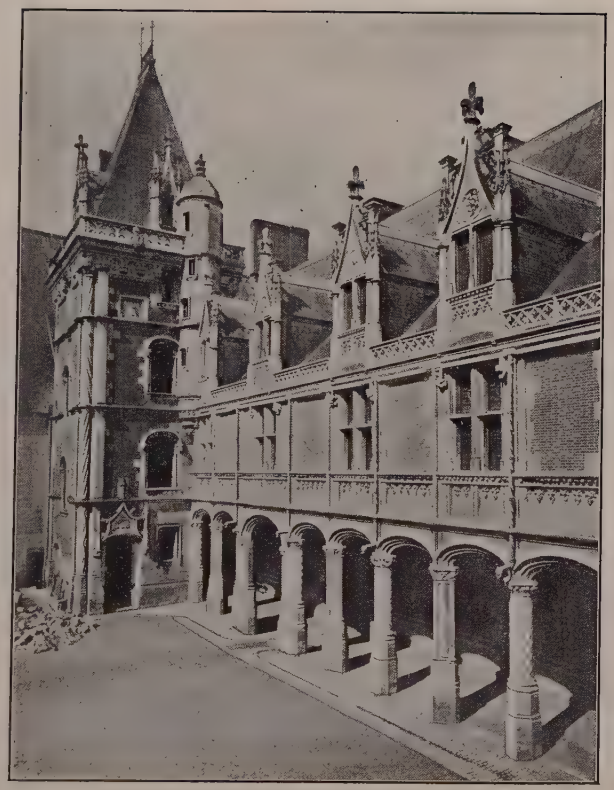
characteristic Gothic indifference as to uniformity of size or thickness. Some of these stones extend into the brickwork the length of three bricks, while others are toothed in only one brick length. The effect of this may be more clearly seen in the colored detail of the inner court elevation, Fig. 51. The contrast of color between the red brick and buff stone is here evident, and the detail of the dormers may be more closely studied.

The entrance is composed entirely of stone, which flanks it on both sides in richly diapered columns, as in Fig. 52 (*a*). These columns support the base of a canopied niche, which contains a statue of Louis XII on his charger, as shown in Fig. 52 (*b*). The background of the niche was painted blue and on it the fleur-de-lis was contrasted in gold. Beneath is the crowned porcupine, the adopted emblem of Louis XII, and the crowned initials of the king and of Anne of Brittany, his queen. To the right of the main entrance is a little sally port for pedestrians, and over this a balcony projects in front of a recessed window. The roof is high and is covered with purple slate, while studied dormer-windows center over the windows below.

It will be observed that the only attempt at regularity in the entire elevation is in the arrangement of the windows to form a series of perpendicular lines. The entrance with its sally port at the side and the balcony above are all unsymmetrical, and the extension of the wall to the north is of different material, having been built a long time previous, during the 13th century.

103. The façade on the inner court, Fig. 53, shows a similar arrangement of windows and dormers in the second story and roof, but the first story consists of an arcade supported on piers that are alternately square and round in plan, as shown in Fig. 54 (*a*). These piers, like the columns that flank the door on the outer court, are richly ornamented with carved diaper work on the round piers and long, carved panels on the square ones, the latter being suggestive of the coming Renaissance. At each end at the

FIG. 53



(*a*)

(*b*)

FIG. 54

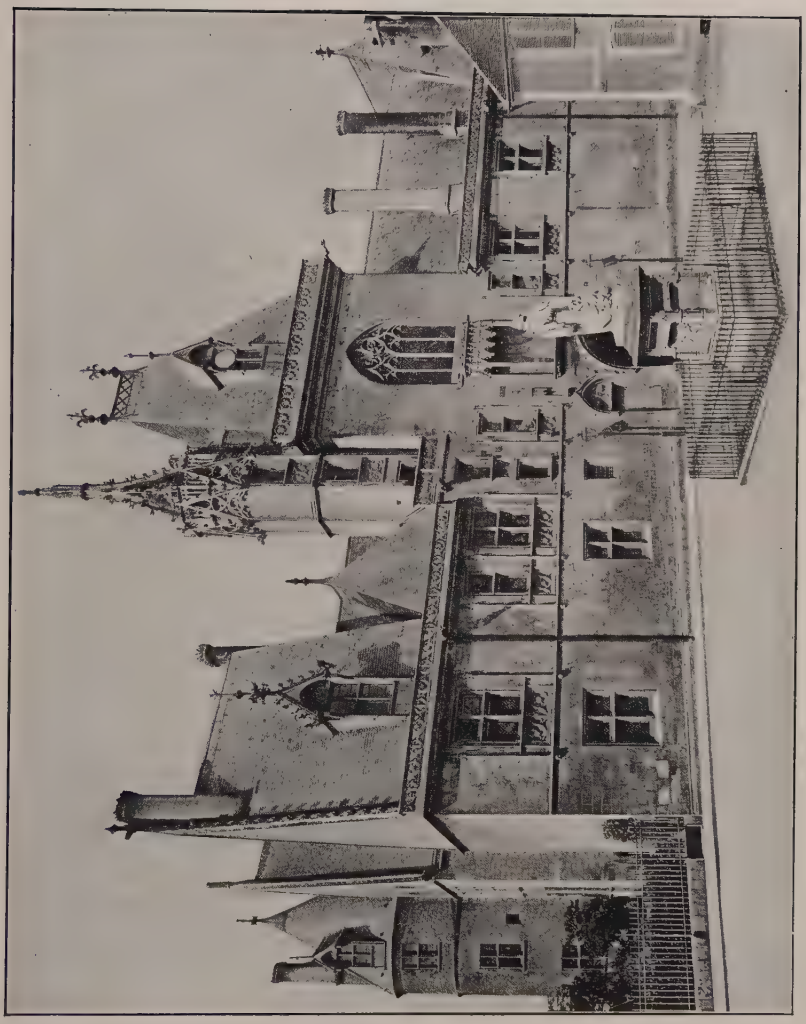


FIG. 55

I L T 303—27

arcade stands a square pavilion, within which a staircase leads to the upper stories. The arcade continues beyond the south pavilion and supports a low second story adjacent to the chapel, as shown in Fig. 54 (*b*). The chapel is a dainty structure, with an entrance at the southwest end, over which are carved in the soft stone, shields bearing the fleur-de-lis of the French king and the ermine of Anne of Brittany.

104. Private Châteaux.—Among the châteaux that were erected by private citizens, that of Jacques Cœur, at Bourges, Fig. 55, is a fine example. The street front presents a central pavilion, in which a large entrance, flanked by a smaller one, is inserted, as at Blois, and over it is a canopied niche to receive a statue. This form of entrance was followed in many of the constructions of this period, many of them being even more elaborate than the one at Blois, as was the case of the entrance to the château of the dukes of Lorraine, at Nancy, Fig. 56.

On the inner-court side, the house of Jacques Cœur presented a central tower, within which a staircase wound to the upper apartments, as shown in Fig. 57 (*a*). This tower was octagonal in plan, and at the angles were slightly projecting buttresses that carried the vaulting under the stairs. It will be well to note these buttresses carefully, and also the canopy on the face of the central buttress, as these are details that reappear in a later structure of importance. The difference in the level of the windows on each side of this buttress is caused by the winding stairs, and as the windows on the right are lower, they indicate that the stairs ascend from that side. The floor levels on opposite sides of the stairs are also different, there being three tiers of windows on one side and only one on the other. This arrangement further indicates the Gothic indifference to symmetry.

The central tower containing the stairs was a conspicuous feature of the French châteaux, another one at Bourges, the Château de Meillant, Fig. 57 (*b*), possessing a most elaborate example, on each side of which the stories continue at the same level.

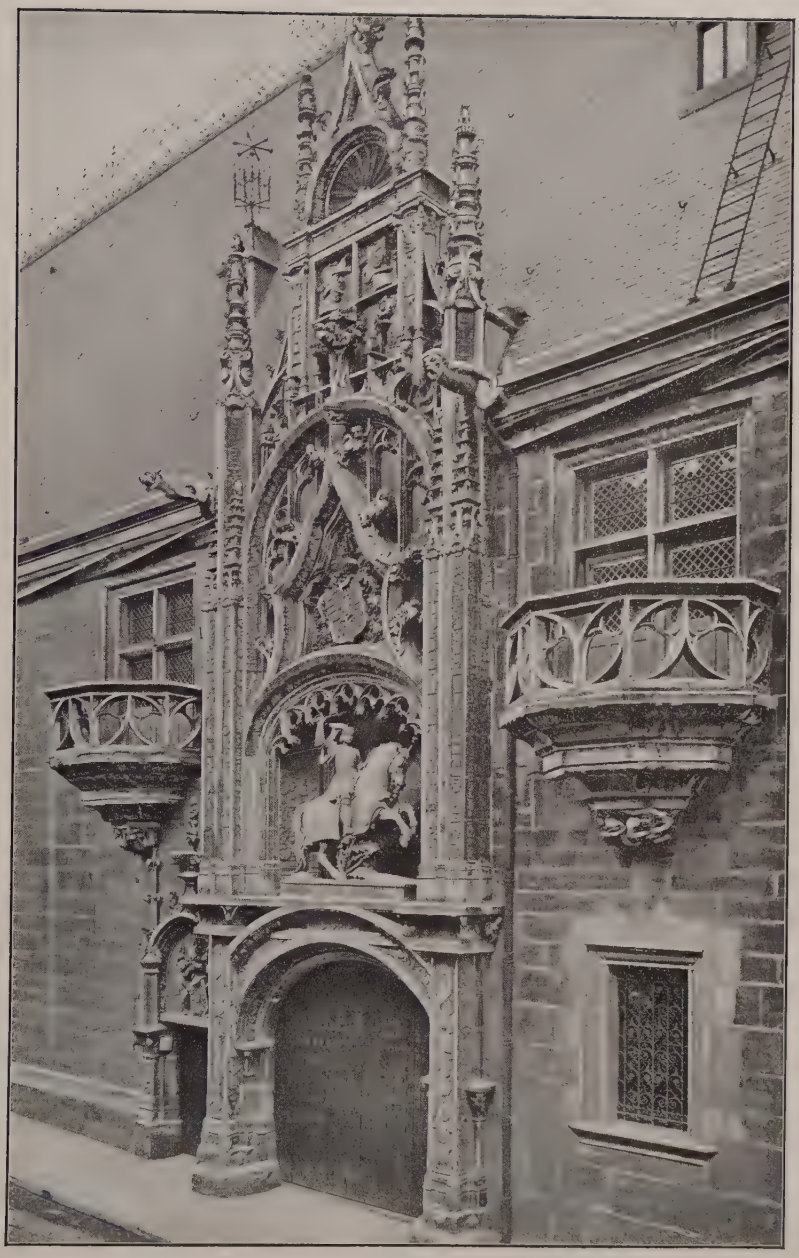
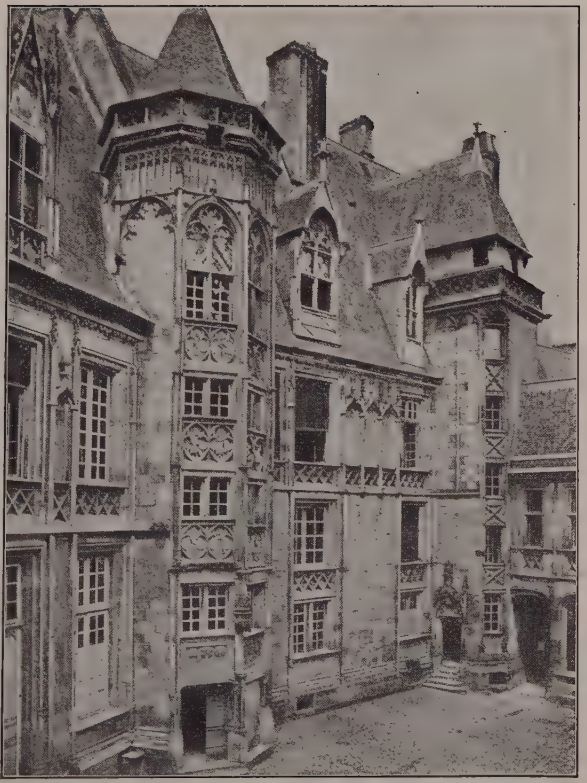
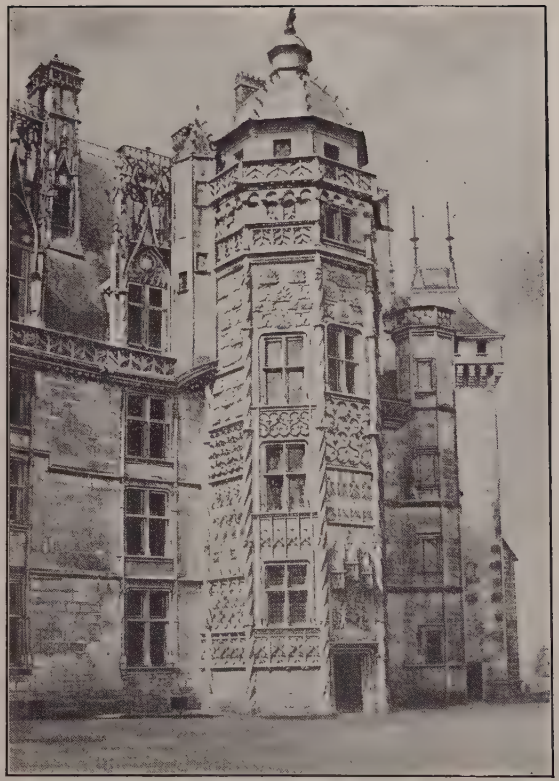


FIG. 56



(*a*)



(*b*)

FIG. 57

(*a*)

(*b*)

FIG. 58

105. Among the private châteaux is Château de Nacqueville, shown in Fig. 58 (*a*). The residence portion of this building has been remodeled, and the old moat in front of the main terrace is now converted into a lily pond. The old entrance to the inner court, with its drawbridge and portcullis, Fig. 59 (*a*), still stands, however, and serves as a grim reminder of the good old days "when knights were bold."

106. Chaumont Château.—The château of Chaumont, Fig. 58 (*b*), designed by Philipe de l'Orme, occupies a bluff overlooking the river Loire and is most picturesque when viewed from the valley below. The situation is ideal for an edifice of this character, as its elevated position is most suitable for this style of architecture.

The early history of Chaumont is a varied one, as it frequently changed hands not only among French masters, but among foreigners also. In 1169, it was held by the English. Nothing of importance concerning Chaumont is recorded until the 15th century, when it was destroyed by Louis XI and rebuilt by the duke of Amboise. Chaumont is less fortresslike in appearance than Pierrefonds, but it does not present the horizontal lines and strong classic details that mark later structures. It would therefore appear to have been erected earlier than the châteaux at Chenouceau and Blois, although de l'Orme was state architect under Henry II.

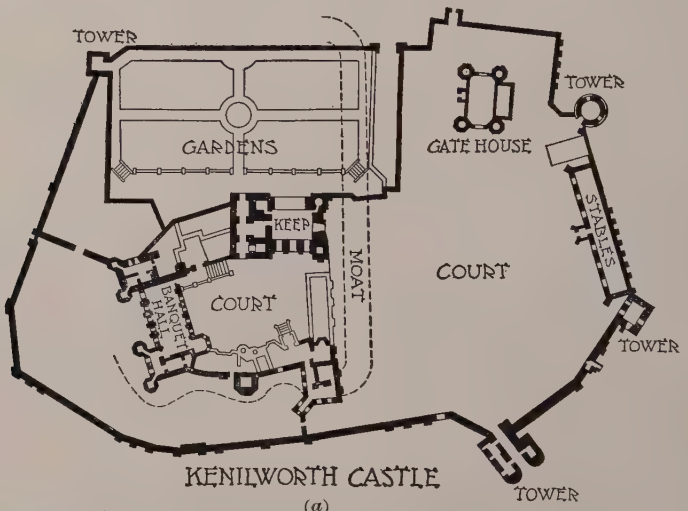
The ground plan of Chaumont is fundamentally that of a medieval fortress. Almost as irregular as the castle of Coucy, Fig. 46 (*a*), it spreads out fan-shaped, with the entrance at the narrow end and a round tower at each angle, while its broad side overlooks the river. The sides enclose an irregular court, upon which the windows of the principal apartments open, as in Pierrefonds, Fig. 48 (*a*).

There is an overhanging battlemented gallery running entirely around the outer wall of Chaumont, but it is roofed over, making a continuous covered passage. The main roofs are steep and the tower roofs are pointed like a candle extinguisher, thus producing an irregular sky line that strongly assists its Gothic feeling.

(*a*) (*b*)

FIG. 59

About the middle of the 16th century, Chaumont was purchased by Catherine de Medici, who owned it for 9 years. After that it was sold and resold many times, until in the 18th century, it was bought by a Mr. Leray, who turned it



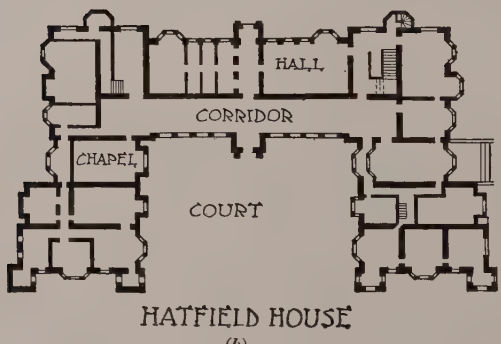


FIG. 60

into a tile factory. The fact that this château was used for such a purpose saved it from the depredations of the revolution, in 1793, when other châteaux were either burned or razed by the revolutionists. Chaumont had so long been a tile factory, that it was not considered a royal possession.

(*a*)

(*b*)

FIG. 61

107. Kenilworth Castle.—Although over a thousand fortified residences were erected in England during the 11th century, comparatively few are known at the present day. Some, being a menace to royal power, have been destroyed, while others have been modernized and still serve as residences. Probably the most renowned of these feudal castles is Kenilworth, made immortal by Scott's historical novel of that name. Its plan, Fig. 60 (*a*), is typical of the English

Fig. 62

castle, and in extravagance of apartments and magnificence of furnishings, it was one of the finest castles in England.

108. Warwick Castle.—Among the early castles still standing that have been converted into modern residences is Warwick, Fig. 61 (*a*). This illustration shows the inner court as it exists today, closed at one end by the original structure and flanked on the right by the modernized buildings that are occupied by the Earl of Warwick. The two large towers are known as Cæsar's tower and Guy's

(*a*)

(*b*)

FIG. 63

tower. The former, completed in 1370, is an irregular polygon, 147 feet high, while the latter was named after Guy, the legendary first earl of Warwick. Guy's tower is twelve-sided, 30 feet in diameter at the base, and has walls 10 feet in thickness and 128 feet in height. The central, or clock, tower, Fig. 61 (*b*), contains the entrance to the court, as shown. This entrance opens into a long passageway cut through solid rock, and this passageway is guarded at the opposite end by another tower containing a portcullis, as shown in Fig. 59 (*b*). The castle was built on the banks of the river Avon, over which the resident section of the structure stands today, as shown in Fig. 62.

109. Palaces in Germany.—Germany did not develop its palaces at such an early period as France, although there were castles and military strongholds scattered all over the country. These, however, were occupied only in time of war, when their owners sought them for safety. During peaceful times, the German barons dwelt in other places, many of them following some simple vocation.

110. Venetian Palaces.—In Italy, especially in Venice, the residence developed a national style. Gothic architecture in Venice was so entirely different from the Gothic of Northern Europe, that in speaking of the style, it is almost invariably qualified by the term Venetian Gothic.

Venetian Gothic architecture depends largely for effect upon its window treatment. Arcaded balconies between flanking masses and rectangular panels treated with traceried arches characterize the style. This is illustrated in Fig. 64 and also at (*b*), (*c*), (*d*), and (*e*), Fig. 41.

The Ducal Palace, Fig. 63, faces on the Grand Canal and presents a front of two stories in arcades and a tall roof treatment over them. The capitals and arches are richly carved, and characteristic tracery pierces the spandrels. The left side of the building faces St. Mark's Square, opposite St. Mark's Church.

111. The palaces Cavalli and Foscari, Fig. 64 (*a*) and (*b*), respectively, present the same general details

(*a*)

(*b*)

FIG. 64

as the Ducal Palace, except that they are differently arranged.

The single narrow structure shown in Fig. 65 is the little palace of Contarini Fasan, generally known as the house of Desdemona.

TOWN HALLS

112. The prosperous condition of the individual cities in the Netherlands and in Germany greatly influenced their political architecture. Owing to the form of government that had developed in this part of the country, it was necessary for the cities to protect themselves rather than to depend on the king or any specific power, and through these arrangements for local protection arose many quaint customs and usages.

A belfry attached to the town hall was considered a great honor to the locality, and it was a privilege that could be obtained only by charter. The belfry at Bruges, Belgium, Fig. 66, is one of the most picturesque of these towers built at this period. It is 352 feet high, of massive construction, and has a winding stairway leading to its top, where a set of chimes have played a fraction of a tune every quarter hour, without interruption, for the past 300 years.

113. The town halls and gildhalls were especially fine, the one at Bruges, Fig. 67, being elaborately decorated with tracery windows and canopied niches. Within the niches were placed statues of the principal characters in the history of the country.

114. The city hall at Brussels, Fig. 68, is similar in character to the one at Bruges, but it is more elaborate in detail, and its tall central tower terminates in a spire. This structure faces on a large square, on the opposite side of which is the courthouse. At the end to the right is a row of gildhalls that are occupied by the several gilds of craftsmen that have been organized in the low countries for many centuries.

115. The town hall at Louvain, Belgium, Fig. 69, reflects the pride and prosperity of that community. The

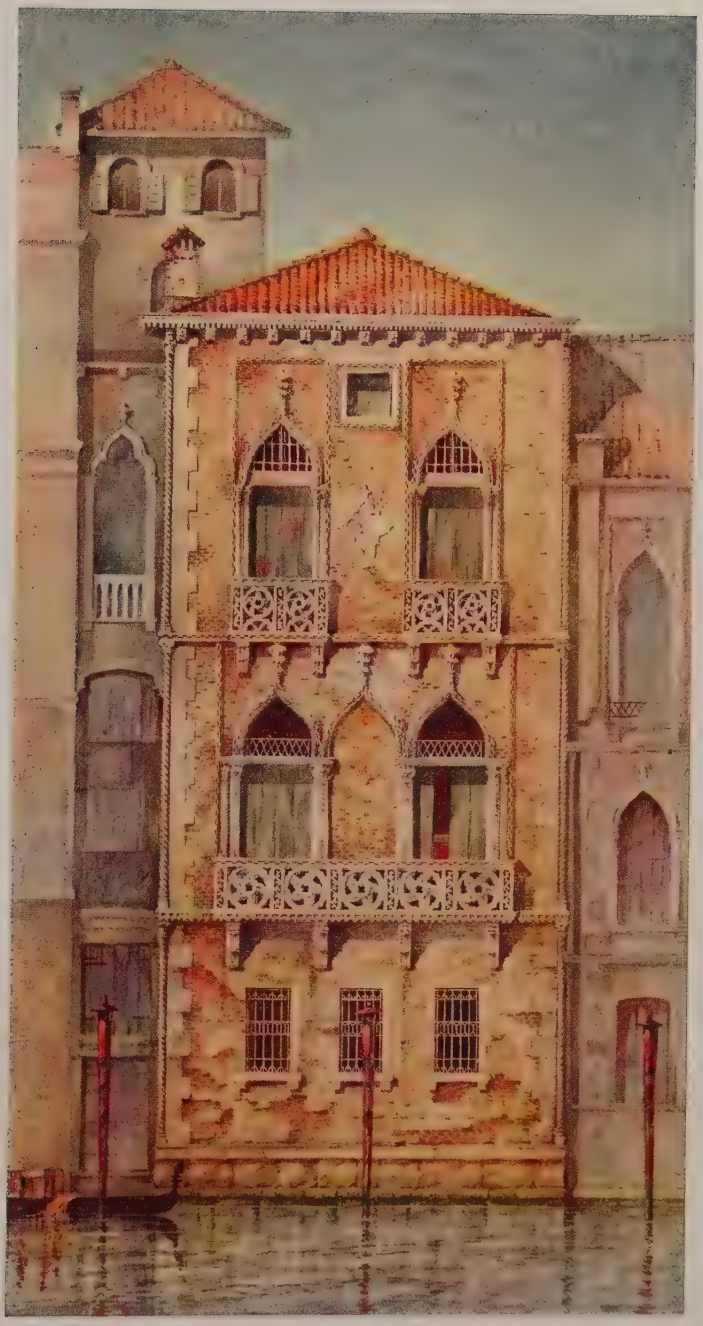


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FIG. 65

Fig. 66

Fig. 67

FIG. 68

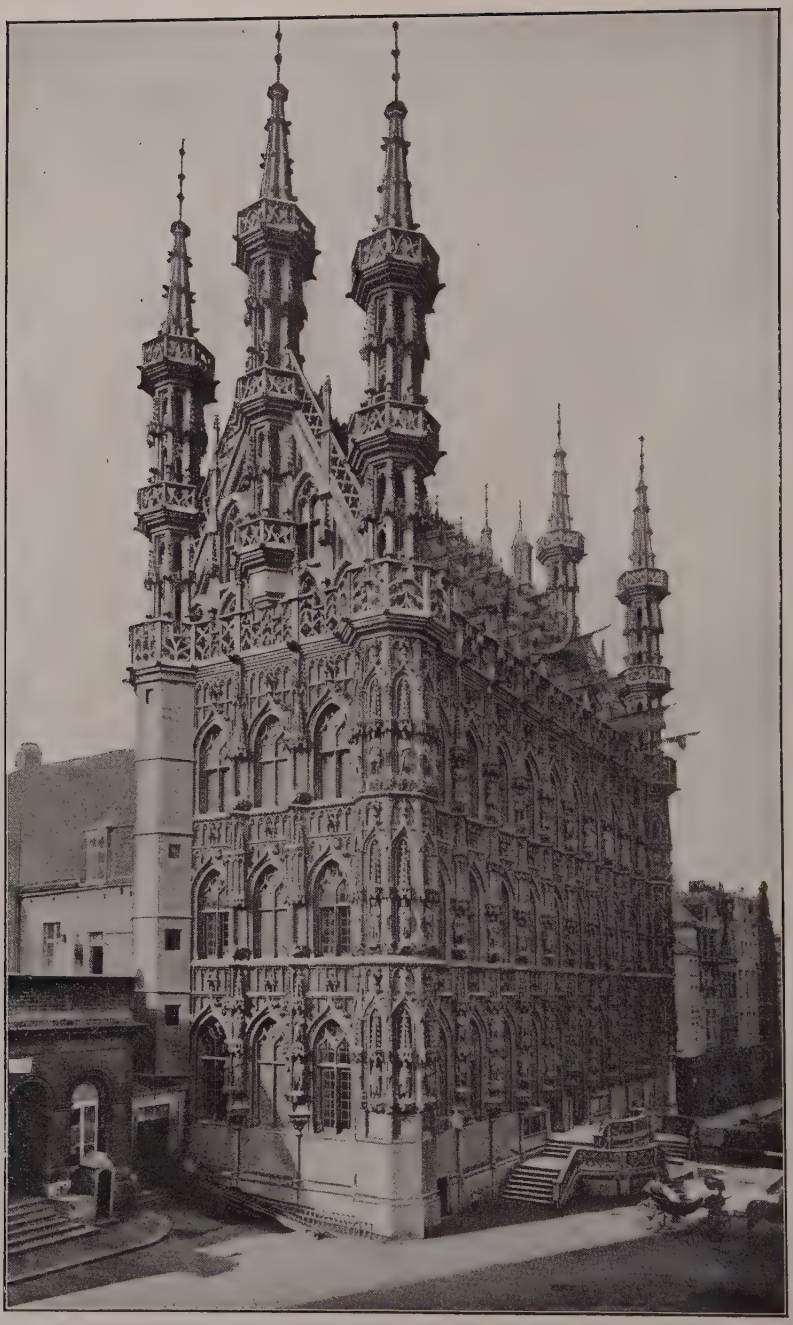

FIG. 69

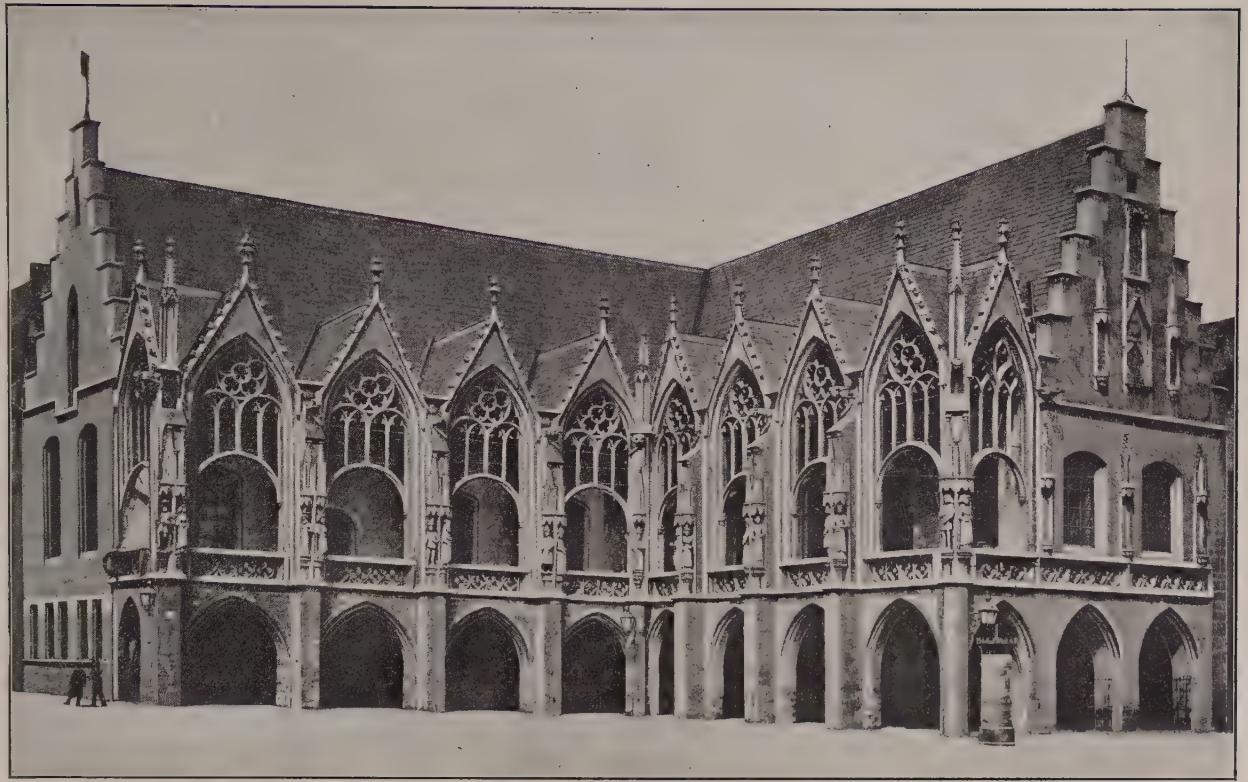

Fig. 70

same general decorative schemes that were employed in Bruges and Brussels are used here, and under canopied niches local heroes are represented in marble effigies.

116. Of a more simple character is the city hall at Brunswick, Germany, Fig. 70. The design of this building is decidedly ecclesiastical, yet it presents the same indifference to regularity and balance that characterizes all Gothic constructions. In this example, the high-pitched roof over the main structure is closed in between two stone-stepped gables, and beyond it and independent of it is a two-story arcade, the upper part of which is treated as a series of traceried dormer-windows.

117. At Münster, Germany, the city hall, shown in Fig. 71, consists of only one façade, the lower portion of which is treated as an arcade, while the upper consists simply of a stone screen against the gable. This building is very pretentious, although not especially pleasing, as it has the appearance of flimsiness and gives the impression that it would be likely to blow over in a high wind; an impression that is further strengthened by the numerous braces that can be seen behind the pinnacles, apparently steadying them in their positions.

Gothic architecture, however, never attempted in its best periods to hide its construction; it was a system based on construction, and the gable was usually treated as a gable and no attempt was made to hide it. This town hall at Münster, therefore, is a digression that indicates a decadence in the style.

118. The city hall at Rochelle, France, Fig. 72, partakes more of the feudal character that is seen in the early châteaux of France. The walls surrounding it enclose a court and are crested with battlements supported on corbels. Corbeled towers guard the angles, and the characteristic doors for pedestrians and mounted visitors give access to the interior.

119. In the secular architecture of the Netherlands, the roofs have steep pitches and are frequently terminated by

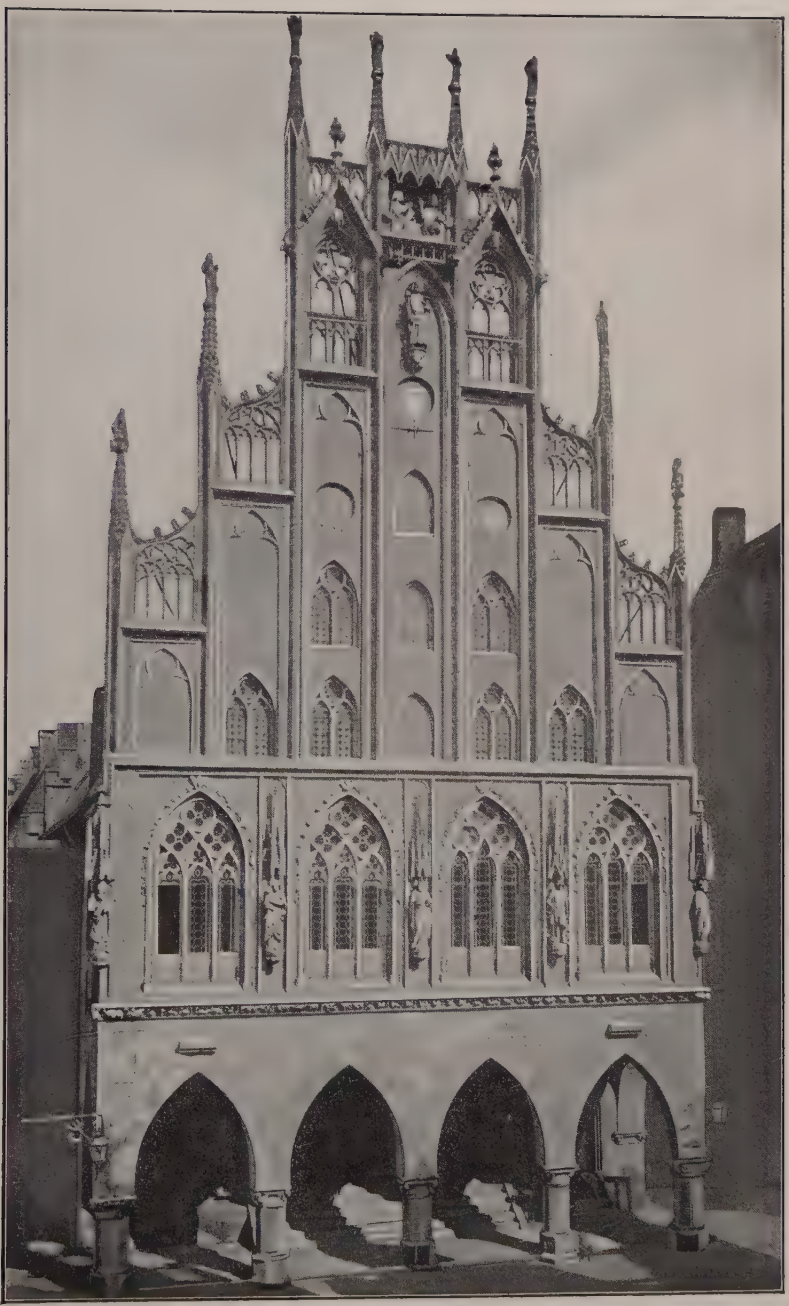

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FIG. 71

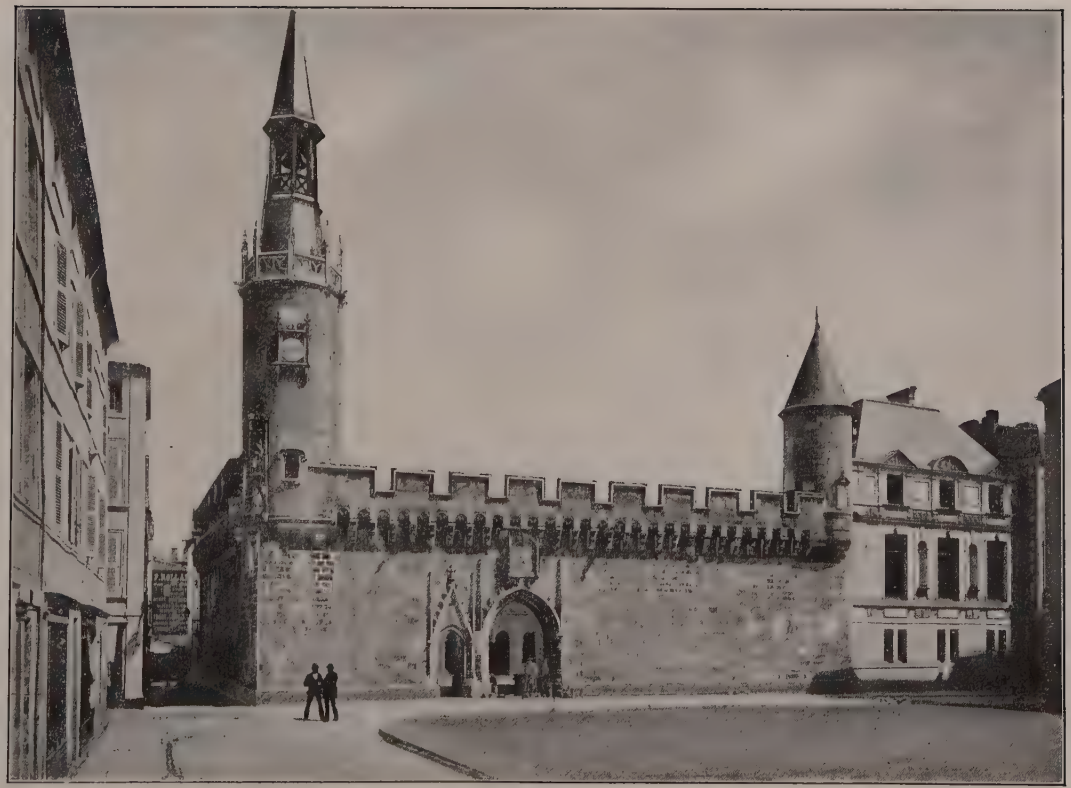

FIG. 72

FIG. 73

crow-stepped or traceried gables of picturesque outline. Turrets and chimney stacks of an ornamental character, with dormers and pinnacles, combine to give variety to the outline.

The walls are more regular in design than in other countries, and as irregularity and independence of relation of one part to another is generally characteristic of the Gothic style, the symmetry and proportion of the Netherland edifices are contrary to the characteristics of Gothic architecture in other countries. (See Figs. 66, 67, and 68.)

Elaborate tracery and paneling characterize the window openings, rows of windows being arranged symmetrically on each side of the center of the building or between prominent end features. (See Figs. 67, 68, 69, 70, and 71.)

CITY GATES

120. Many city gates still remain in the towns that were once walled or partly walled for protection. Among the most picturesque gates are those of York, England, as shown in Fig. 73. These gates are battlemented and are protected by small turrets in which are loopholes for the discharge of small projectiles. There is something deeply impressive about these formidable relics of feudal days as they still stand at the entrances of the older cities. At York, as at other places, the city has grown beyond its original limits, and some of the old city gates are now included within the confines of the city proper, as shown in Fig. 74.

121. In Germany, these gates had a more ponderous character, but they presented a very formal appearance; as that at Cologne. In France, the château style of architecture was followed, and the gate at Nancy, shown in Fig. 75, is very picturesque. This gate has a corbeled attic between its two towers, in the floor of which are machicolations through which boiling oil or molten lead could be poured on the heads of any unwelcome visitors that tried to force an entrance. The loophole over the center of the doorway

FIG. 74

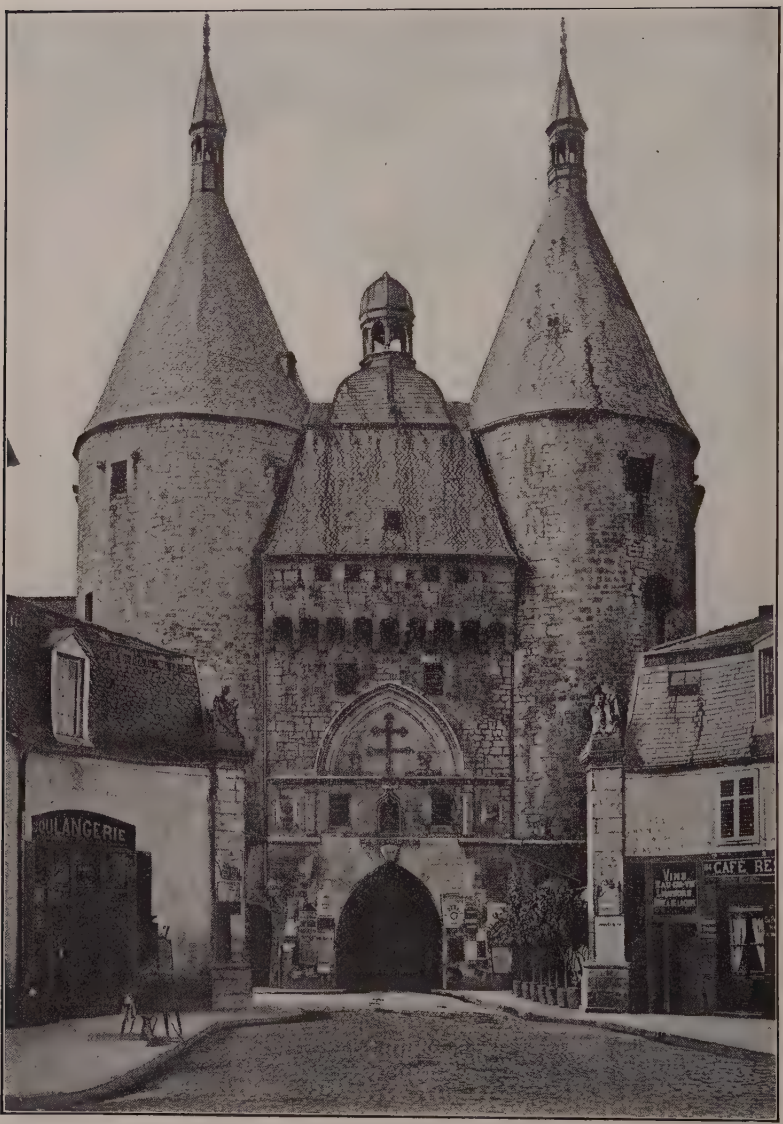

FIG. 75

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FIG. 76

is in the form of a double cross, thus combining the decorative motif with the necessities of conditions.

122. At Bordeaux, France, the city gate and the city clock tower, as shown in Fig. 76, are combined in a picturesque construction that rises high above the surrounding buildings. Here, the single tower is carried above the arch, and then it is split into two towers, between which a bell is hung. It then unites over a low, pointed arch that springs tangent from the towers themselves.

MINOR DWELLINGS

123. Some small dwellings were framed with a timber construction, and the open spaces between the structural framework were filled in with brick or sometimes plastered over (see Fig. 77). This was termed *open-timber construction*, and was essentially Gothic in principle, as heavy timbers supported roofs and floors, while the brickwork was simply an enclosing screen between the supports.

In Germany, the roofs of these houses were very high, and frequently contained more stories than the house proper, which it covered. The space under the roof, as in Fig. 78 (*a*), was used as a drying room for the household wash.

In some cities, the ridge was placed parallel with the street, and numerous dormers were introduced for ventilation; while in other places, the ridge was at right angles to the street, and the windows were grouped under the gable. Gables were projected on brackets, and the woodwork was frequently carved elaborately. [See Fig. 77 (*b*).]

(*a*)

(*b*)

Fig. 77

(*a*)

(*b*)

FIG. 78

124. Small brick residences were also numerous, particularly in Germany and the Netherlands. On these the front walls were carried up in a gable, the pitches of which, instead

FIG. 79

of being simple, straight lines, were stepped, as shown in Fig. 79. These stepped gables, especially in the Netherlands, are prominent throughout the Gothic and succeeding periods.

REVIEW EXERCISES

1. Describe the architectural characteristics of (*a*) the Early French châteaux, (*b*) the English castles.

2. Make a sketch in water color of the elevation of a Venetian palace. The pencil drawing may be made from one of the illustrations in the text and then carefully colored from the example of Contarini Fasan.

3. What important structures other than churches and cathedrals characterize the architecture of the middle ages?

4. Make a finished sketch with pencil or pen-and-ink of a fortified city gate of the medieval period and state what national style it represents.

5. What were the characteristics of the minor residences of the middle ages?

MOSLEM ARCHITECTURE

(637 A. D. to 1492 A. D.)

INTRODUCTION

125. **Moslem, or Saracenic, architecture** is the term applied to the constructions of the nations that were followers of the teachings of Mohammed.

Gothic architecture developed from the Romanesque through a natural progress of construction problems. In a similar manner, Romanesque architecture developed from the Roman vaulted style, and Roman architecture in the Western Empire adopted the Greek orders and developed them to suit the requirements of the Roman constructions. Byzantine architecture developed in the Eastern Empire from the Roman domed style, but as Byzantium was originally a Greek colony, the development of the new style shows a strong influence of Greek art. Rome adopted her art from Greece and applied it to her massive construction. Byzantium borrowed construction from Rome and combined it with art borrowed from Greece.

Moslem architecture first developed from the Byzantine, but not in the sense that Byzantine or Gothic developed from the Roman. Moslem architecture at first borrowed neither construction nor decoration from the Christian styles to combine with details of its own, but copied the style entirely.

126. Moslem architecture and ornament will be considered under its principal nationalities: Indian, Arabian, Persian, Turkish, and Moorish. Each nation influenced the style by its particular characteristics, and for this reason the Moorish architecture in Southern Spain is found to be only slightly related to the Moslem work in Turkey. The ornament and decorative schemes, however, are not surpassed in ingenuity in any Christian style.

INFLUENCES

127. Geographical.—Important as was the influence of Byzantine art in Europe from the 6th to the 11th century, there was no people that it affected more than the great and spreading Arab race that propagated the creed of Mohammed, and, after conquering the finest countries in Asia and Africa, finally obtained a footing even in Europe. In the earlier buildings executed by them in Egypt, Palestine, and Spain, the influence of the Byzantine style is very strongly marked, and the tradition of the Byzantine school affected all the adjacent countries to a greater or less degree.

Although the Arabs must have possessed an original art, only a few traces of it remain, and these are in legends wherein grand buildings are spoken of that date back to remote antiquity.

It is known that the wandering and stationary tribes distinguished each other by the names "Felt people" and "Clay people," and this would convey the impression that the latter title implied a knowledge of ceramics; but the character of the decoration of the pottery of these early tribes is at present unknown, as is also that of their arms, fabrics, and fixed dwellings.

On their contact with the Greeks, East Indians, and Persians, the Arabian people produced a style of ornament that formed an important part in the compromise now called by the name Byzantine. Subsequently, when Byzantine art had reached its zenith, Arabian art, under the influence of Mohammedanism, took the form under which it is now known, and may have shown in some applications a certain Byzantine influence exercised on the Arab practice. It is unreasonable, however, to consider Byzantine art, as is sometimes done, as being originally a formation of the Arab style, as the latter has too much character and unity not to be in itself an original conception. There appears to have been a mutual influence exercised between the Byzantine and Arabian during the earliest periods, as inevitably happens in a contest for supremacy between two neighboring styles.

128. Geological.—As the different countries presented different geological formations, the style was influenced locally by the material at hand. In Turkey, domes were of brick and plastered inside and outside, and in Northern and Central India, they were of stone. Marble and sandstone were also available in the latter country, and a monumental style of design was developed. In Spain, the walls were of brick and were plastered on the inside, as were also the wooden partitions separating the rooms.

129. Climatic.—The climate varied somewhat with the different countries, but the development of the style was confined to eastern and southern countries, so that, generally speaking, the climate was excessively hot. This gave rise to a tendency toward small window and door openings.

130. Religious.—Moslem architecture was essentially a religious style. Gothic and Byzantine architecture were developed by Christian nations, but the nations were established before the religion was adopted, and the architecture was developed on structural principles. Moreover, the wars of the Roman Empire that carried the Christian religion into remote parts, were wars for conquest and not for the extension of Christianity. With the Moslems, however, the reverse was the case. It was the religion of Mohammed that united them into a nation, and it was the forcing of this religion on other nations that extended their empire and spread their arts from India to Spain.

The Moslem belief is a simple one and is summed up in the quotation from the Koran, "God's will be done." The Moslem is therefore a fatalist, and believing all things to be preordained, he made no great effort toward any great future achievement. He believed the future had been arranged by God before he himself came into the world. The present was everything to him, as it was all he would be sure of, and this often led to the erection of buildings that were far from permanent themselves. They were, however, lavishly decorated in unsubstantial materials, such as wood, lattice, and plaster.

131. Political and Historical.—As has already been stated, the Saracens in the 8th century spread themselves over Northern Africa and Southern Spain, and while the rest of the world during the so-called dark ages was plunged into the darkest ignorance, Bagdad in Persia, Cairo in Egypt, and Cordova and Toledo in Spain were centers of brilliant, artistic, and intelligent activity under the Moslem government. The Saracen Empire was ruled by a *caliph*, Mohammed being the first. After his death, four other caliphs ruled in succession. Then disputes arose and the empire became divided between two caliphs, one ruling at Bagdad, in Persia, and the other at Cordova, in Spain (see *History of Architecture and Ornament*, Part 2, Arts. **36** to **38**). The caliphate of Cordova became divided into the four kingdoms of Seville, Granada, Toledo, and Valentia. These kingdoms were frequently at war with the Christians in Spain, but this did not prevent the Moorish builders from employing Christian workmen on their buildings, and in this manner there was some Gothic influence expressed in their constructions.

Each caliph was a spiritual as well as a temporal ruler. He, as successor to Mohammed, was the highest priest of the religion and the chief ruler over all the countries that worshiped according to the Moslem rites. These rites were set forth in a book called the Koran, written by Mohammed by dictation from an angel alleged to have appeared to him in a vision.

The religious and civil government thus united had the effect of injecting a religious element into every architectural structure. The change and multiplication of capitals, due to the change of dynasties, also gave impetus to much secular building. The position of women in the Moslem social system exercised great influence in the planning and designing, as provision had to be made for the isolation of the harem, or apartment where the women dwelt, and was also responsible for the elaborate lattice of the windows that would not permit one to see into the apartments from the street or from them into the street.

(*a*) (*b*)

FIG. 80

CHARACTERISTICS

132. The temples, or places of religious service, of the Moslems are called *mosques*, and these with the palaces and tombs constitute the most important architectural structures—structures that, as heretofore stated, are of interest almost entirely on account of their lavish and brilliant decorations. The mosques consisted of low, flat-roofed buildings, within which numerous rows of columns supported a series of arcades that gave the interior a mysterious and complex appearance, as shown in Fig. 80 (*b*). These were roofed over so as to give a dome effect on the exterior. The domes were usually of a bulb shape, rather than hemispherical, and at the angles of the building were erected tall, slender minarets, or signal towers, from the top of which the muezzins, or priests, summoned the faithful to worship.

The Koran forbade the Moslems to make any pictorial representations of any living thing in their architecture or decoration, as such representation was considered as idolatry; consequently, their decorative schemes consisted mostly of geometrical constructions representing intricate and ingenious fretwork and interlacing of straight and curved lines. There can be but little doubt, however, that this commandment was interpreted liberally in some districts where the decorative schemes appear to be based upon vegetable forms.

The introduction of quotations from the Koran in Arabian characters interwoven with elaborate geometrical ornament, is an innovation original with the Moslems, and friezes and borders of great richness and variety were thereby obtained. (See Fig. 89.)

The pointed arch, similar to the Gothic form of Northern Europe, was used extensively in Egypt and the East, while in Spain and other western countries under Moorish domination, the horseshoe arch (Fig. 87) seems to have been more popular.

EXAMPLES

133. At Cordova, Seville, Toledo, Granada, and several other cities in Andalusia (see Fig. 42) may be found magnificent monuments to the art and skill of the Moslems. These structures were all erected prior to their expulsion in 1492 A. D.

134. The Alhambra.—The Alhambra was the palace and fortress of the Moorish kings at Granada. The exterior of this structure, Fig. 80 (*a*), is impressive, but it is undecorated, as were other feudal castles. The interior, however, was gorgeous beyond description. The walls were tiled below and elaborately diapered in relief above and brilliantly, but harmoniously, colored in blue, red, and gold. The wainscot of the tiles were in geometrical patterns, introducing greens and browns as well as reds and blues. There was no structure problem solved here, however, as the reliefs are all modeled in plaster, supported on a light framework of latticed wood.

135. The Giralda.—The Giralda, or tower of the cathedral at Seville, shown in Fig. 81, is one of the most celebrated towers in the world. It was rebuilt after burning in 1395, and though not so lofty as the original, it is still a most imposing architectural detail.

It is built in two different styles, the lower portion being part of the original Moorish prayer tower, while the top consists of a crown of Renaissance detail. It is hardly conceivable that two such widely differing styles of architecture could be combined in one design and result in as harmonious a composition; yet the Giralda of Seville is as satisfactory a composition as can be found in any country. For two-thirds of its height (about 200 feet) the tower consists of a plain massive structure faced with reddish tiles. Eighty feet above the ground the severity of the tower is relieved by a characteristic surface decoration in panels diapered in arabesque ornament. The original design was battlemented at the top, as were all the feudal-castle towers, but in 1568 the

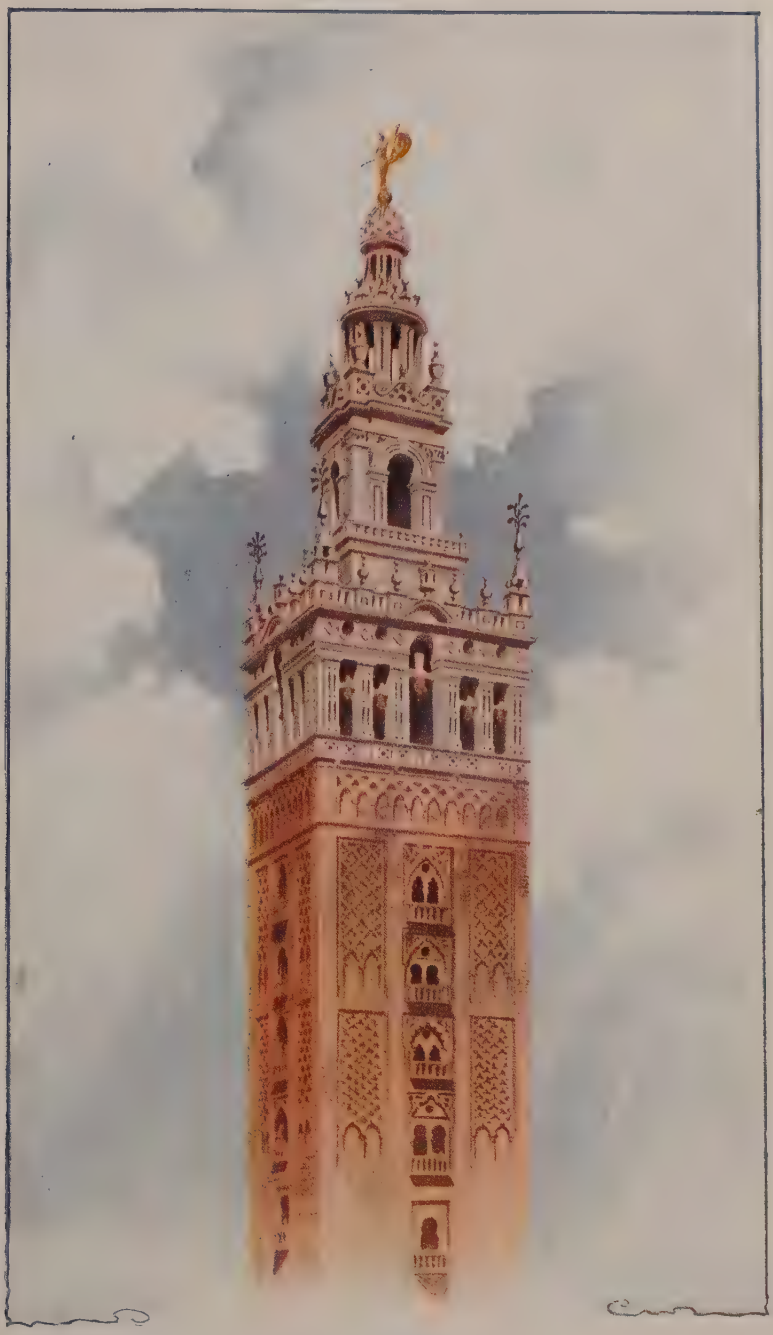

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FIG. 81

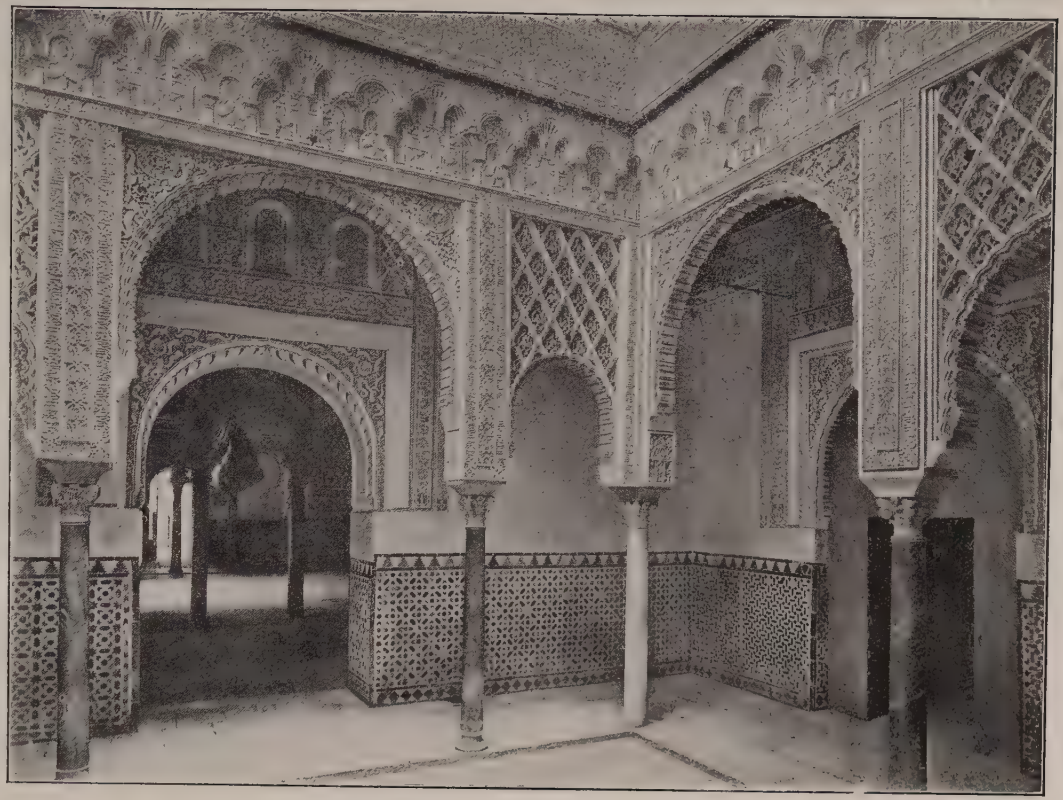
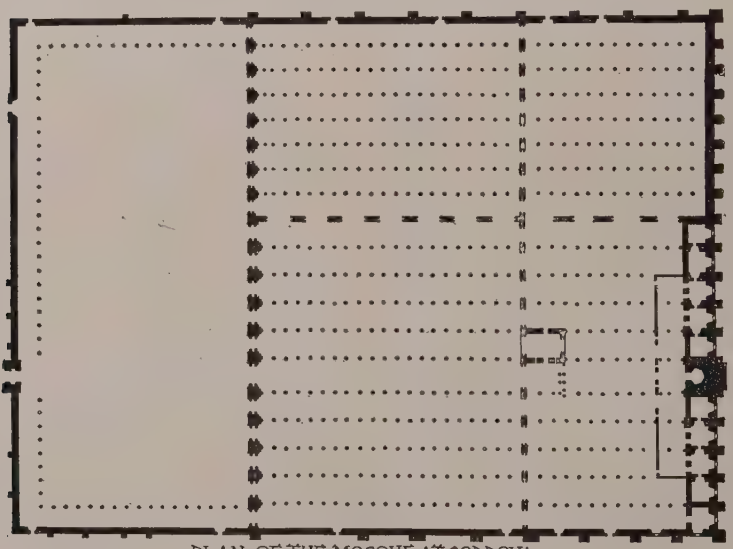


FIG. 82

Renaissance superstructure was added, of which mention will be made under the subject of Renaissance Architecture (Art. **154**).

136. Alcazar at Seville.—The alcazar, or palace, at Seville, an interior view of which is shown in Fig. 82, was erected about 1350. This structure is now in a partly dilapidated condition, but enough remains to enable one to judge the magnificence of the original design.

137. Mosque at Cordova.—The mosque at Cordova, the plan of which is shown in Fig. 83, was erected in 786. It consists of a parallelogram 422 ft. × 573 ft., and its area is greater than that of any of the cathedrals. This



PLAN OF THE MOSQUE AT CORDOVA

FIG. 83.

structure contains seventeen rows of columns, thirty-two in each row, supporting two sets of horseshoe arches elaborately cusped and richly decorated, as shown in Fig. 80 (*b*). The perspective thus formed by this forest of columns is most impressive and inspiring.

ANALYTICAL STUDY

PLANS

138. The plans of the mosques (see Fig. 83) generally consisted of a rectangle with an open, unroofed space in the center, containing a fountain for ablution as enjoined by the Koran. Around this open space was a series of columns supporting arcades, and on the side toward the sacred city of Mecca (east) extra rows of columns were planned so as to give greater depth of covered space. At the corners, minarets arose, and these were usually octagonal, though in some instances they were square. Some of the eastern mosques are cruciform in plan, the central portion being left open and the four arms vaulted over.

The dwellings were also planned with an interior court, and the principal rooms opened from this place on three sides, as shown in Fig. 84.

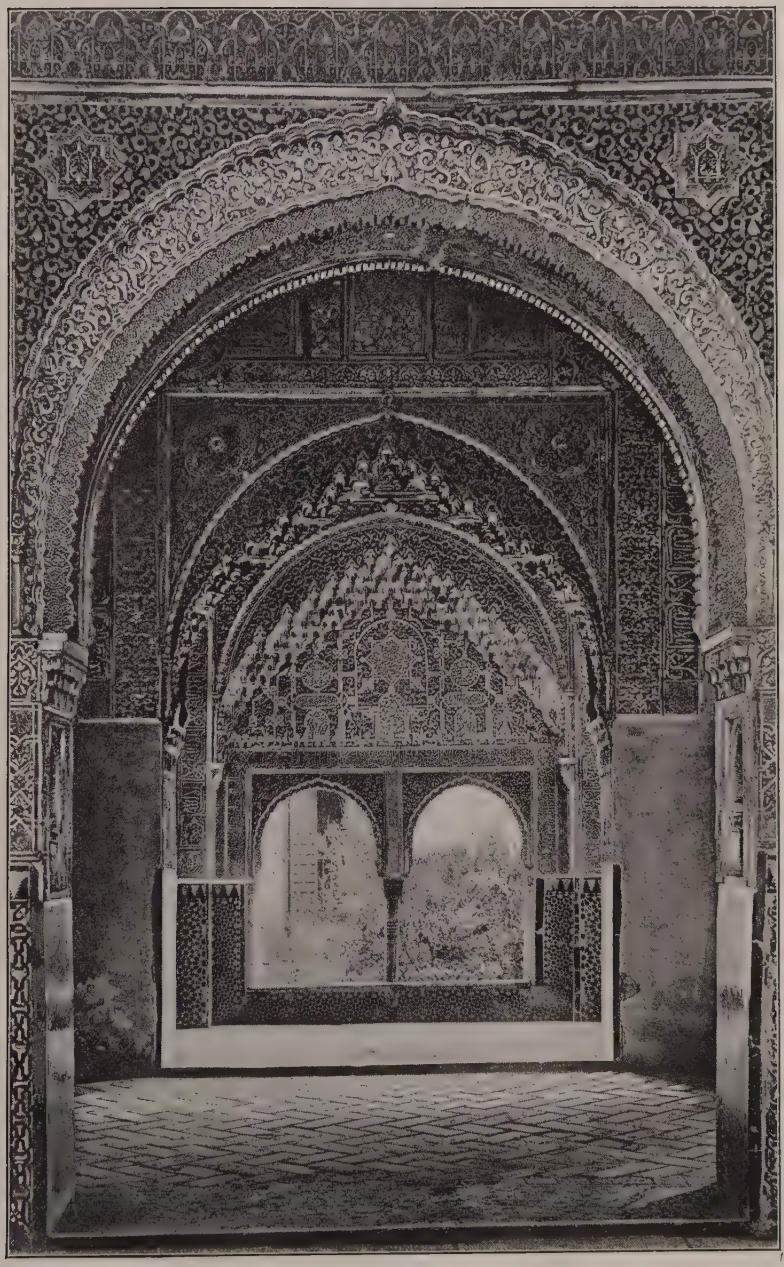
WALLS

139. The Moslem walls were constructed of brick, stone, or other material, according to what each community provided. They were elaborately ornamented with fine surface decoration in tiles, rare stones, or relief plaster. In the interior of the Alhambra, the walls are wainscoted to a height of 4 feet with glazed tiles, above which a rich arabesque decoration is carried out in plaster, as shown in Fig. 85. In Cairo, some of the walls are built of brick in the first story, and of wood and plaster above.

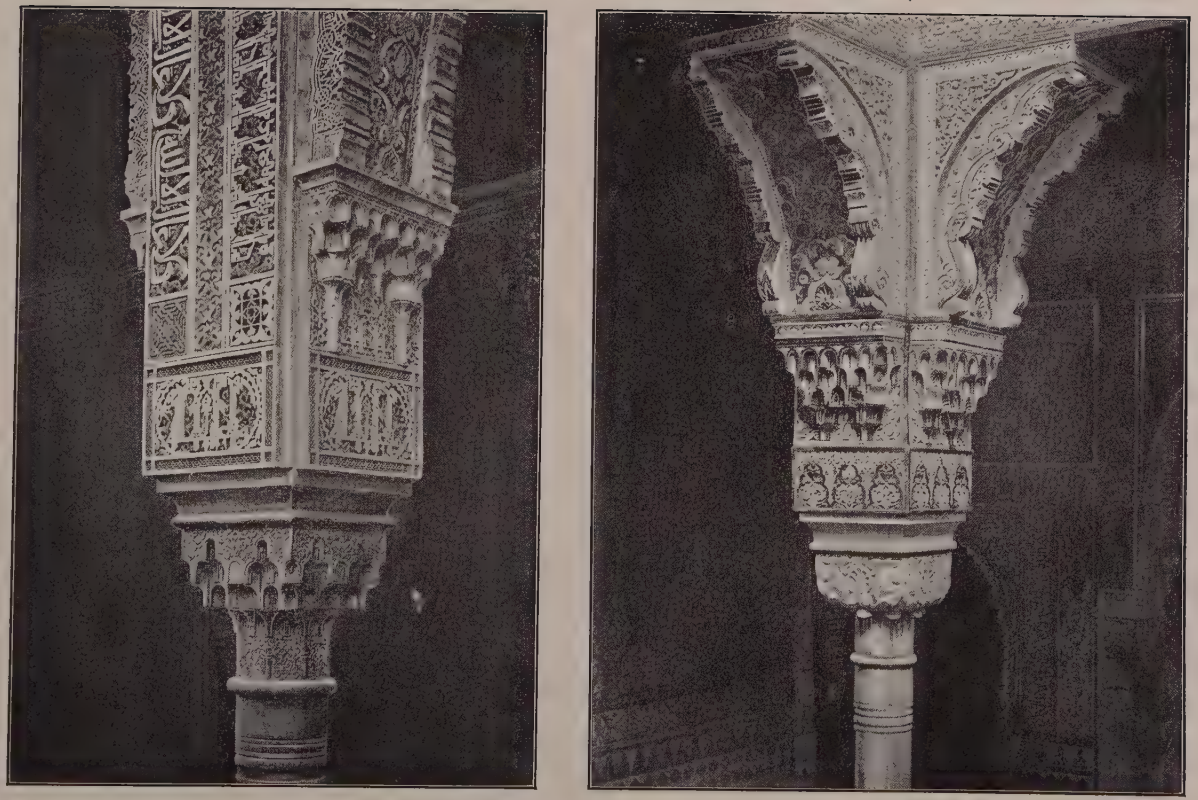
ROOFS

140. The ceilings were usually flat, except where a dome was used, and were richly decorated in colors and gilding. The dome was a characteristic feature of the mosques and tombs in the eastern section, but is not often seen in Spain. Except where the Byzantine model was closely

Fig. 84



153 FIG. 85



(*a*) (*b*)

FIG. 86

followed, the dome is seldom hemispherical, but of a bulbous shape, and windows were frequently placed in the lower parts. The domes were built over square compartments, and the pendentives of the Byzantine style were replaced by a series of projecting corbels, one over another.

COLUMNS

141. Many of the early Moslem buildings used old columns taken from Roman or Byzantine ruins. A characteristic style soon developed, however, and in the Alhambra are found examples of original compositions that are at once graceful and pleasing. The capitals are usually square, with a long necking, and the supporting column is tall and slender. (See Figs. 86, 87, and 88.)

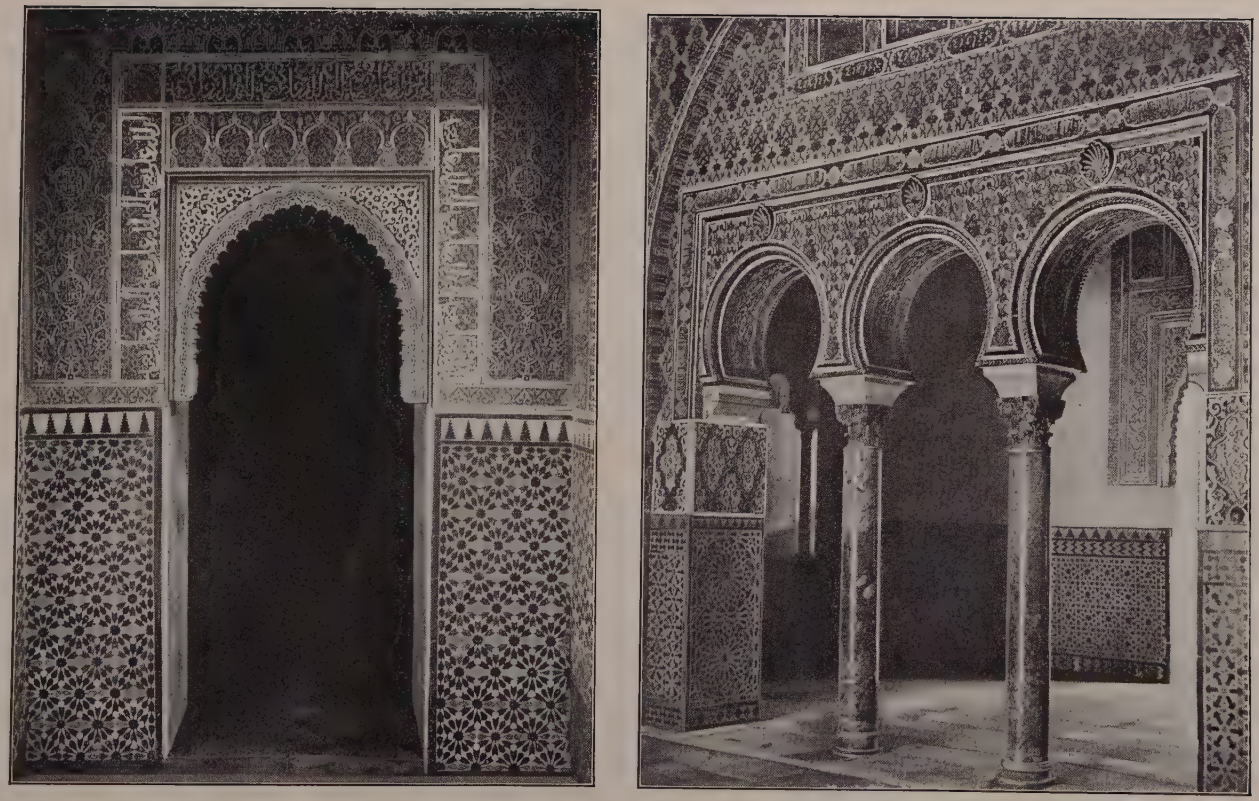
OPENINGS

142. The Moslem windows were small, owing to the excessive heat. They were nearly always fitted with elaborate lattices in geometrical patterns and were occasionally glazed with colored glass. The window heads and other openings usually conformed to one of four styles: (1) The pointed arch, which was used with square jambs and unmolded soffit; (2) the ogee arch, which was used mostly in Persia and India; (3) the horseshoe arch, Fig. 87 (*b*), which is characteristic of both Spain and North Africa; and (4) the foliated arch, Fig. 88, which is typical of the Moors in Spain.

These arch forms when used for doorways and arcades, were frequently tied across at the springing point with a wooden beam or an iron rod.

MOLDINGS

143. Moldings were of little importance, their place being taken by elaborate bands of surface decoration. Occasionally, however, moldings of the Byzantine model were used around doorways and window openings.



(*a*) (*b*)

FIG. 87

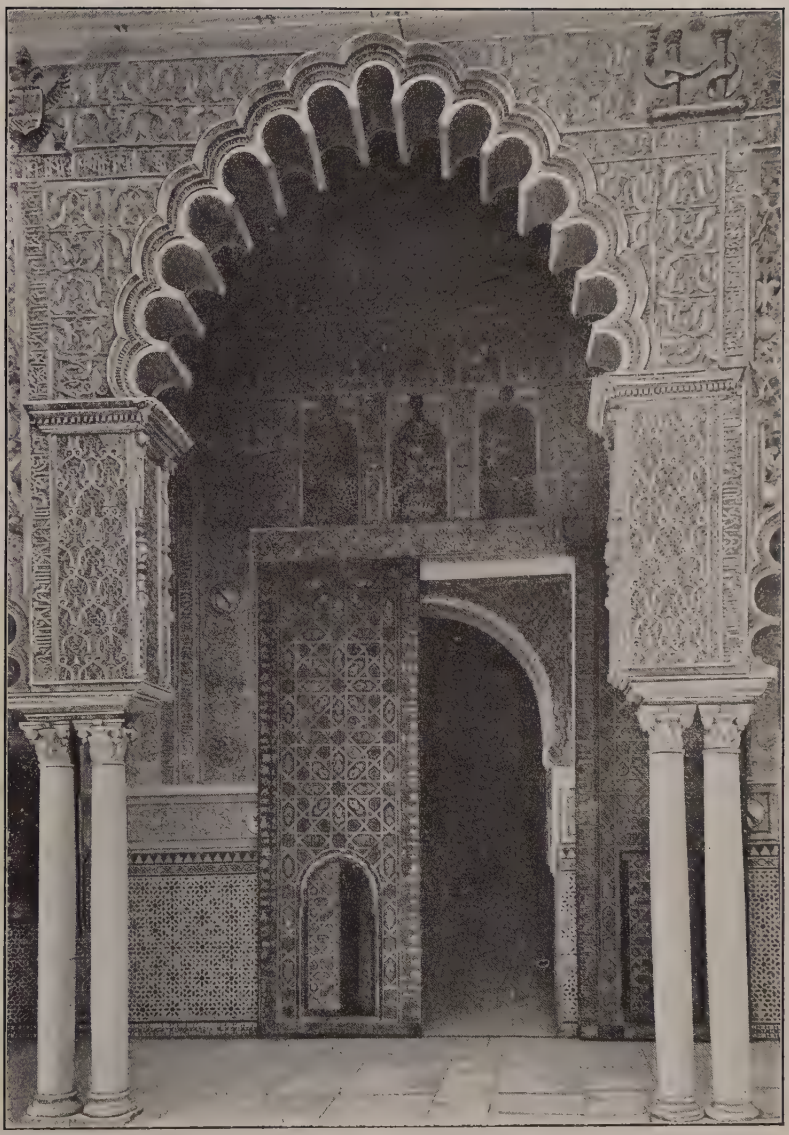


FIG. 88

(a)

(b)

FIG. 89

ORNAMENT

144. The crowning glory of Moslem architecture was the ornament. This was practically limited to inanimate and non-vegetable types, owing to restrictions of the Koran, and presented mostly geometrical patterns of great intricacy and diaper treatments in endless variety. The Moslem designer being thus deprived of the opportunity that enabled the Gothic architect to treat his façade with elaborate sculpture, developed in its stead an intricate scheme of color that produces most beautiful results.

145. Classification of the Moslem Ornament.—The ornament may be divided into four general classes, as follows:

1. The **mnemonic,** which consists of quotations from the Koran interwoven with geometrical constructions, as shown in Fig. 89.

2. The **superposed,** which consists of a diaper pattern in relief laid over a ground pattern of a more or less geometrical character, as in Fig. 90 (*a*) and (*b*).

3. The **stalactite,** which was used primarily in place of pendentives, as in Fig. 86.

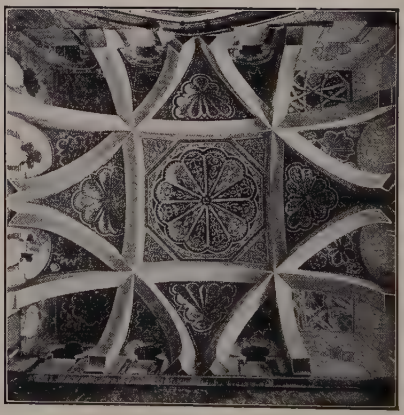
4. The **geometrical,** which consists of interwoven bands and ribbons, as in Fig. 91.

146. Moorish Ornament.—In Moorish art, the decoration arises naturally from the construction, and the constructive idea is carried out in every detail of the ornamentation of the surface. In decorative schemes, the general forms were first cared for; these were subdivided by general lines, the interstices of which were then filled with ornament that was again subdivided and enriched for closer inspection. The Moors carried out this principle with the greatest refinement, and the harmony and beauty of all their ornamentation derived their chief success from this observance; their main divisions contrasted and balanced perfectly. The detail never interferes with the general form, and, when seen at a distance, the main lines strike

(*a*)

(*b*)

(*c*)



(*d*)

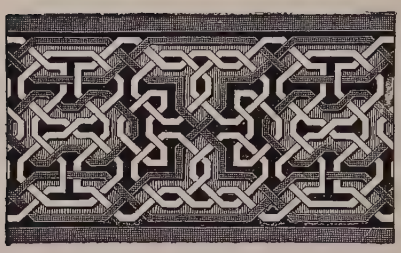
FIG. 90

the eye and the fine detail disappears; nearer approached, more detail comes into the composition, and, on close inspection, all detail of the surface appears as a grand powdering of ornament.

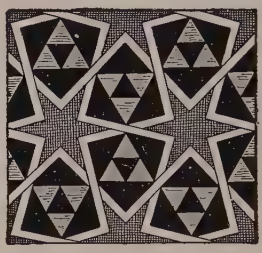
Moorish ornament lacks the charm of symbolism that is so characteristic of Egyptian ornament; but its place is filled by the Arabic inscriptions, which address themselves directly to the eye by their personal beauty. They not only excite the intellect by the difficulties of deciphering their complex and curious involutions, but also delight the imagination when read by the beauty of the sentiments they express and the music of their composition. Long fantastic letters, interwoven with graceful but intricate geometrical patterns, as shown in Fig. 89, lead the eye to decipher the words, find sentiments that are ever present and associated with all their daily doings, and simple but truthful phrases elaborately twisted or intricately woven, of which the one most frequently repeated is the quotation from the Koran: "There is no conqueror but God."

147. Coloring in Moorish Ornament.—The coloring of the Moorish ornament was treated as skilfully as was the form. The Moors followed certain fixed principles founded on observations of natural laws. The colors employed on their stucco work were in all cases a combination of the three primaries—blue, red, and yellow, the last being represented by gold—and the secondary colors—purple, green, and orange—occurred only in the mosaic dados. These, being nearer the eye, formed a point of repose from the more brilliant coloring above.

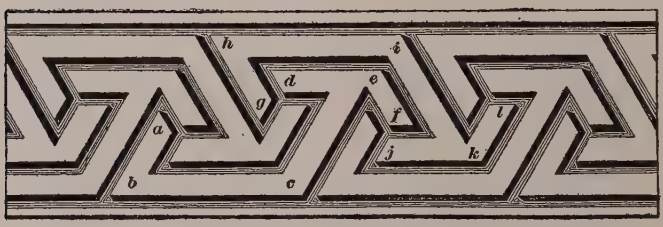
148. It may be remarked here that among the Egyptians, Greeks, Arabs, and Moors, the primary colors were used exclusively in the earliest period of the arts, and, during the decadence, the secondary colors were used. Thus, in Egypt, the temples of the Pharaonic period were painted entirely in primary colors, while those of the Ptolemaic period used the secondaries. The early Greek temples were decorated in the primary colors, while at Pompeii every



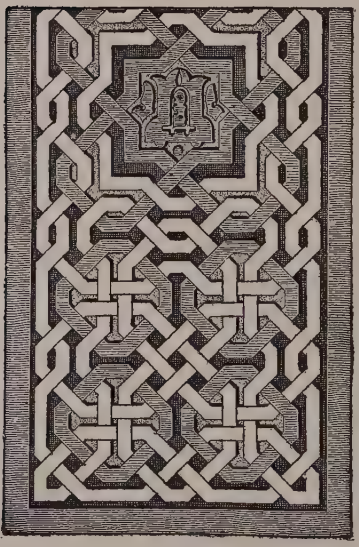
(a)



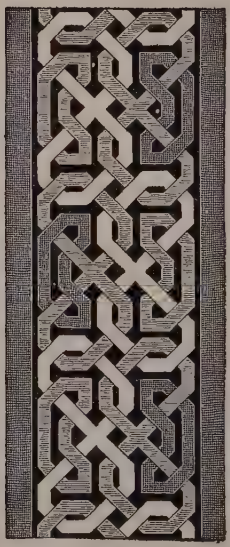
(b)



(c)



(d)



(e)

Fig. 91

(a)

(b)

(c)

(d)

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FIG. 92

variety of shade possible appears. In modern Cairo, and in the East generally, green appears frequently side by side with red, where blue would have been used in the earlier times. This is equally true of the works of the middle ages. In the early manuscripts and in stained glass, the primary colors were chiefly used, although other colors were not entirely excluded; while, in later times, every variety of shade and tint is used indiscriminately, with preference for none.

149. In Moorish art, the primary colors were used in the upper portions of the design and the secondary and tertiary colors in the lower portions. This is entirely in accordance with natural law, as the primary blue is shown in the sky, the secondary green in the trees and fields, and the tertiaries in the earth itself. This color scheme is also observable in flowers, where the primary colors are the buds and flowers and the secondaries are the leaves and stalks.

150. System of Moorish Coloring.—The system of Moorish coloring might be considered absolutely perfect. All the surfaces were modeled and proportioned according to the color they were to receive, and, in using the colors blue, red, and gold, care was taken to place them in such positions that they should be best seen themselves and add most to the general effect. On molded surfaces, red (the strongest color of the three) was placed in the depths, where it might be softened by shadow, and never on a raised surface; blue was placed in the shade, but not deep shade; and gold was placed on all the surfaces exposed to strong light, for it was evident that by this arrangement alone could their true value be obtained. The several colors are either separated by white bands or by the shadow caused by the relief of the ornament itself, and this seems to be an absolute principle required in coloring—colors should never be allowed to impinge on one another. (See Fig. 92.)

151. Interlaced Ornament.—Moorish interlaced ornament is governed by certain geometrical patterns in its formation, and although the number of these patterns is small the variety of designs produced on them is great.

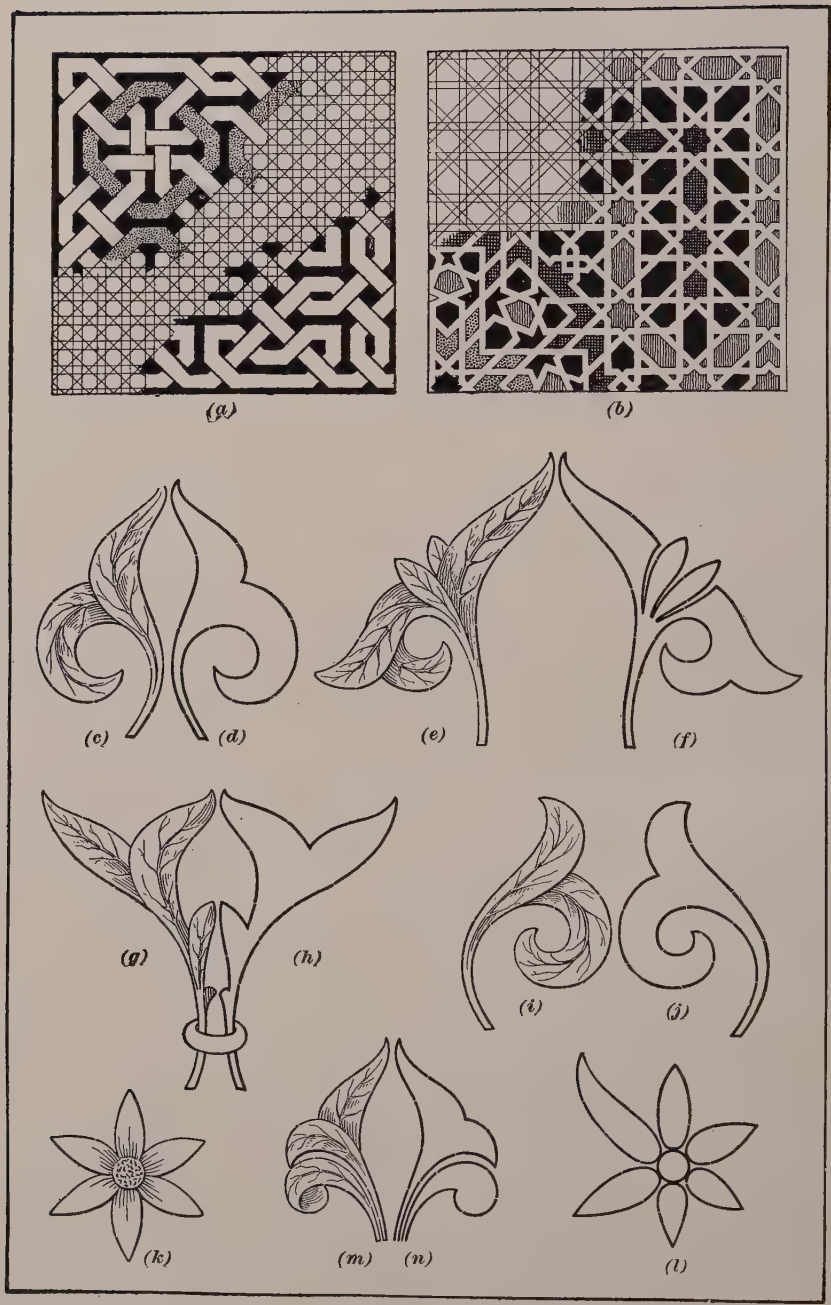


FIG. 93

In Fig. 93 (*a*) is shown an interlaced pattern consisting (1) of vertical and horizontal lines arranged in pairs, the distance between each pair being twice the distance between the lines composing each pair, and (2) of diagonal lines drawn through the pattern at an angle of 45°, and spaced a distance apart equal to the vertical and horizontal pairs. The diagonal lines are arranged so that the set of squares formed by their intersection will contain in their centers the intersection of the vertical and horizontal pairs.

In Fig. 93 (*b*) is shown a slight variation of the preceding interlaced pattern. In this example the vertical and horizontal lines are drawn singly and the diagonal lines are drawn in pairs, but of slightly different proportion. The amount of Moorish ornament that can be developed from these two figures is unlimited, and the Moors themselves extended even this limit by the variety of coloring in the different parts. Figs. 91 (*d*) and (*e*) are based on the system shown in Fig. 93 (*a*).

152. Moorish Motifs.—No matter how much the whole ornamentation of the Moors is disguised, it is all constructed geometrically. Their fondness for geometrical forms is evinced by the great use of mosaics, in which their imagination had full play. However complicated may be their patterns, the mosaics are all extremely simple when the principle of setting them is once understood. They all arise from the intersection of equidistant sets of lines around fixed centers. [See Fig. 89 (*a*) and (*b*).]

153. Notwithstanding the fact that the Mohammedan was forbidden by the Koran to execute ornament based upon animal or vegetable types, there can be no doubt that some of the characteristic devices found in the Moorish wall decorations were conventionalized forms based upon leaves and flowers. In Fig. 93 (*d*), (*f*), (*h*), (*j*), (*n*), and (*l*) are six forms that constitute the details of the surface decoration shown in Fig. 94, and it can be readily believed that these conventional forms were derived from the plant forms shown in Fig. 93 (*c*), (*e*), (*g*), (*i*), (*k*), and (*m*).

154. Arabian Ornament.—The forms just mentioned enter largely into the characteristics of Arabian ornament, although not to such a marked extent, as may be seen in Fig. 95 (*a*) to (*f*). Here, the characteristic Arabian interlaced work is united with the peculiar foliated terminal that

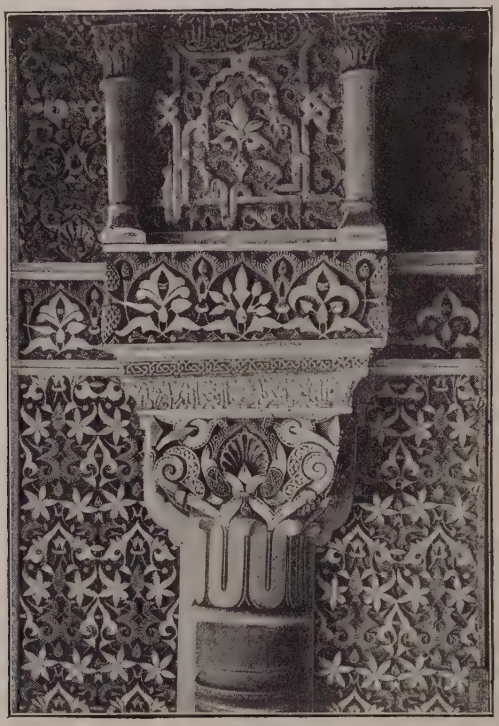


Fig. 94

is found in no style but the Arabian, and is similar to the foliations analyzed in Fig. 93.

155. In tilework and inlay, the Arabians were particularly adept. Fig. 95 (*g*) and (*h*) shows examples of their ingenuity and skill in the design of tile pavements.

In Fig. 91 (*b*) is shown another example of this style of ornament, taken from a mosaic pavement in a mosque at Cairo, Egypt. Here, the geometrical simplicity of the pattern can be easily traced, as the design consists simply

(b)

(d)

(e)

(f)

(g)

(h)

218-I L T 101 § 51

FIG. 95

of two horizontally arranged zigzag lines, crossed at regular intervals by sets of diagonally arranged zigzag lines.

156. In Fig. 91 (*c*) is shown an ornament generated on a different system, but on a similar geometrical idea. This ornament, too, is suggestive of the fret pattern, though entirely different from any frets that have hitherto been observed. However, the shape of the enclosed figure *a b c d e f*, it will be observed, is identically the same as the figure *g h i j k l*, and the repetition and alternate arrangement of these two peculiar outlines give the key to the whole system of ornament shown in the figure.

157. Fig. 96 (*d*) is from an illuminated copy of the Koran, and illustrates the influence of Byzantine art on that of Arabia. The general construction lines of the ornament are Byzantine in character, while the filling in is typically Arabian.

Another pattern is shown in Fig. 96 (*e*), and consists of a number of scrolls of a more or less geometrical character, and, though simple in itself, it is fascinatingly complicated in its conception. The design is executed in two colors, and a little study will show that the outlines of the two colors are identical. The light portions of the design in the upper half of the figure are a duplication of the dark portions of the design in the lower half of the figure, and vice versa. Every detail on one half is exactly reproducible in the opposite color on the other half, and, if the figure were sawed out on the line dividing the two colors, it would produce two outlines exactly the same in every respect.

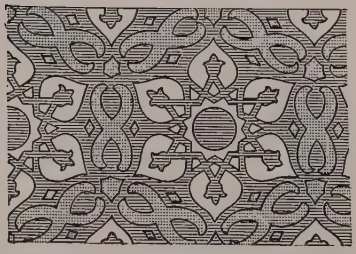
158. East Indian Ornament.—The most striking characteristics of East Indian ornament are continuity and abundance of decoration. The surface decoration is usually filled up entirely with a profusion of ornamental forms that, if not exactly alike, are very similar. The ground color is always warm and harmonious—occasionally light, though more frequently dark—which serves to unite the designs and to add greatly to the general effect.

The method of distribution and the admirable feeling for color procures in Indian decoration a richness and calm that

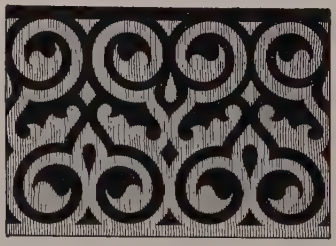
(*a*)

(*b*)

(*c*)



(*d*)



(*e*)

FIG. 96

gives it an undefinable sense of repose. The designs are usually based on some floral type and are treated in a most conventional manner, and though the imitation bears a closer resemblance to nature than in most of the styles already studied, it is by no means servile. The type from which an ornament is derived can usually be recognized without trouble, and, although floral ornament is occasionally seen under the pure art form characteristic of the Egyptian style, it is usually treated with a pliancy of execution and picturesqueness of idea that brings it to a closer resemblance to the modern style.

In the execution, however, Indian art never attempts the rounding of a form (a process that is naturally opposed to the idea of surface decoration), and usually confines itself to silhouette drawings, in which the outline is shown off by a dark tint on light grounds or by a light tint on dark grounds.

159. In the equal distribution of surface ornament over the grounds, this nation exhibits a remarkable perfection of drawing. An exact balance is obtained between the various colors used, and this balance is carried to such a nicety that it is practically impossible to reproduce any of their woven or embroidered goods with any degree of accuracy. In all their woven fabrics, the colors are so fused together that the entire piece of goods at a little distance presents no individual coloring, but a neutralized bloom.

In Fig. 96 (*c*) is shown a diaper pattern taken from an Indian textile. This example exhibits the regularity of repeated form that completely fills the surface, as just described. There is a slight tendency toward a geometrical formation observable in this pattern, where the wavy line becomes tangent to its neighbor. This geometrical pattern, however, is not so rigidly carried out as in Fig. 96 (*b*), where the construction lines governing the main details consist merely of semicircles connected by short, straight lines, thereby forming knees, as indicated at *a*. The style of ornament enclosed in the geometrical figures thus formed is typical of Indian design, and shows a number of forms

tangent to a general stem, all of which may have had their origin in brush strokes of painted work, or possibly in the shape of the palm leaf, which they slightly resemble.

In Fig. 96 (*a*) is shown a typical example of Indian ornament taken from a woolen fabric, many of the details of which will be found similar to the strokes just referred to.

160. Turkish Ornament.—The architecture of the Turks is patterned after the early Byzantine style, although their system of ornamentation is a modification of the Arabian style. In fact, it may be considered as an application of Arabian ornament, without any understanding of the meaning, derivation, or type of that ornament.

Constantinople was not taken by the Turks until 1453, although they had occupied the surrounding countries for over a century. They immediately adopted the Byzantine style of architecture for their mosques, and thus St. Sophia stands, with some modifications, as the type of Turkish mosque down to the present day.

When the art of one people is borrowed by another of the same religion but of different character, temperament, and customs, the resulting designs are certain to show the deficiency of intellect or refinement that the borrowing people possessed in contrast to that of those from whom it was borrowed; and this is the case with the Turks when compared with the Arabs. There is the same difference in refinement, elegance, and judgment between the Turkish ornament and Arabian ornament as there is between these two peoples. The Turks themselves can hardly be considered an artistic nation. They have built buildings and executed designs in their cities, but have employed foreign artists to do the work. All their public buildings, therefore, present a mixed style. It is not at all unusual to find in a Turkish building floral ornaments of Arabian and Persian origin side by side with details from Rome.

The Turks were the first of the Mohammedan nations to adopt European fashions in architecture, and their modern buildings and palaces are the work of European architects

and artists, and are designed in the most approved European style.

161. The Turkish embroideries give about the only style of ornament that can be considered strictly national, as work of this character must necessarily exhibit the characteristics of the race, and, judging from this, it will be readily seen that their art instinct is far inferior to that of India. Indian embroidery is perfect in the distribution of its forms and in all its principles of ornamentation. With Turkish ornament, the only examples that approach any degree of perfection are found in the carpets, but these are executed mostly in Asia Minor, and are probably not designed by Turks. The designs of most of them appear more Arabian, and differ from the Persian carpets in being more conventional in their foliage treatment.

The most prominent colors in Turkish ornament are green and black; in fact, these colors form a feature of the ornament. In modern Turkish ornament, green is much more prominent than in ancient examples, where blue was the important color.

162. Persian Ornament. — The outlines of Persian ornament are generally taken from the conceptions of Arabian architecture, but they are modified by Indian tradition and the peculiar genius of the Persian race. The floral motif in some examples is scattered through the decoration with apparent freedom, and, in others, it is inserted in the linked network and usually placed at the intersection of lines; but even in the latter case, it is treated in a manner that is half way between the Arabian conventionality and the Indian naturalism. A consideration of the characteristics of the Persians will help to understand this more fully.

163. Persian Compared With Arabian Art.—The Arabs belonged to the Mohammedan sect of Omar, while the Persians had split from this faith, and belonged to the sect of Ali, and were great drinkers of wine. They attributed to flowers a symbolical language, and did not exclude the representation of flowers in their decoration, which is also

animated by real and fantastic animals, and sometimes, though rarely, with the human figure. The resources resulting from this mixed style are enhanced by the manual skill and remarkable fertility possessed by the Persians. Bookbinders, potters, embroiderers, and miniature painters emulate one another in taste and skill. Persian carpets are still considered the finest in the world, and the vases, tiles, and enamel bricks from that country are models of taste, and European manufacturers endeavor to equal them by imitation.

164. Persian Compared With Indian Art. — The Indian and Persian styles resemble each other in their polychromatic decoration. The rule is usually a silhouette, with geometrical outlines relieved by conventional coloring on a dominating generating ground.

The great attention given, in Persia, to the illumination of manuscripts, which were widely spread through all Mohammedan countries, would naturally tend to spread the influence of this mixed style, and the decorations of houses at Cairo and Damascus, and the mosques and fountains even of Constantinople, are tainted with it to a greater or less extent. Groups of natural flowers are represented in vases and enclosed in panels of conventional Arabian ornament.

REVIEW EXERCISES

1. What difference in religious influences affected the spread of Christian and Mohammedan architecture?

2. Describe the general characteristics of Moorish ornament.

3. Describe the system of coloring used by the Moors in their ornament.

4. Into what classes is Mohammedan ornament divided?

5. Make a drawing in color of the elevation of a Moorish arch supported by two or four columns with appropriate decoration in the spandrels. For this, the general idea of the arch may be taken from Fig. 82, 84, or 88; the capitals of the columns from Fig. 86 or 94, and the color scheme from Fig. 92.

6. Make a drawing of Moorish interlaced ornament on a system of intersecting lines, as in Fig. 93 (*a*) or (*b*).

HISTORY OF ARCHITECTURE AND ORNAMENT

(PART 4)

RENAISSANCE ARCHITECTURE

(A. D. 1500 TO A. D. 1800)

INFLUENCES

1. The influences that combined and caused the return to classic architectural models throughout Europe at the beginning of the 15th century are deeply interesting and must be thoroughly understood in order that the character of the reborn style may be comprehended. The term **Renaissance** means rebirth, and may be applied not only to architecture, but also to literature, painting, and manners and customs of the people.

2. Geographical.—The Renaissance movement arose in Italy in the 15th century and spread from there to France, Germany, England, and all Western Europe. Its details varied in the different countries, but the main characteristics were followed out everywhere.

3. Geological and Climatic.—The geological and climatic influences varied in different countries and lent local characteristics to the style in some places.

4. Religious.—The invention of printing about the middle of the 15th century led to a spread of knowledge, a spirit of inquiry, and a diffusion of freedom of thought generally throughout Western Europe. Since the fall of the

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Roman Empire literature had been despised by all except the clergy. There had been no books in any European language for nearly a thousand years; hence, there was no occasion for the people to learn even to read and write. The monks wrote missals and translated portions of the Bible, and many most elaborately decorated pages bear witness today to the conscientiousness of their motives. However, these were out of the reach of the people and were read in the monasteries only.

Through the influence of the classic literature that was published in their language for the first time, the Teutonic races developed a desire to break away from the influences of the Church. This desire was encouraged by the preachings of Martin Luther, in Germany, and of John Wyclif, in England, in which countries the Reformations of the Church proceeded side by side with the Renaissance in architecture. In England, however, where the Reformation took a strong hold on the people, few new churches were built, as there were so many erected during the previous period, but there was great activity in civil and domestic architecture. Henry VIII repudiated the authority of the pope, confiscated the Church properties, and distributed among laymen the wealth and lands of the monasteries. This led to the building of great manor houses, etc. by the possessors of these vast estates. In Italy, on the other hand, the Reformation took no hold at all. Numerous churches were built or rebuilt in the new style, but comparatively few civil or domestic structures were erected.

5. Political and Historical.—As a marked intellectual development always manifests itself first in literature, it soon affects the public taste generally and thus influences the architectural development of the period. Dante, Petrarch, and Boccaccio, three celebrated Italian writers, aided greatly in the spread of the newly discovered classic literature that finally caused a revolt against medieval forms.

In 1453, Constantinople fell into the hands of the Turks, and many Greek scholars fled from there to Italy, where

their learning was also added to that of local scholars, and classic ideas were further instilled into the people.

Among other manuscripts discovered and translated at this time was a book on classic architecture written by Vitruvius in the year 50 B. C. This gave forms and proportions for the Roman orders and was immediately established as a textbook, which is used as a reference in various forms down to the present day.

6. The architecture of Italy was the first to be affected, as the Gothic style had never taken a firm hold there. The problems of vaulting that had contributed so much toward the development of the style in Northern Europe did not trouble the builders of Italy, where Roman remains such as the Pantheon, the Basilica Maxentius, the Colosseum, etc., presented models for further constructions, or afforded places sufficiently large for Christian services.

Feudalism had never taken the hold on old classic Italy that it had on France, Germany, and England, so that the principal cities grew individually strong and developed a spirit of civic pride and municipal enterprise (see *History of Architecture and Ornament*, Part 3, Art. **62**). As classic architecture came to be considered the proper form for all buildings, these cities immediately adopted it for their public structures and private palaces. Hence, in Italy, the Renaissance architecture is varied according to the city, rather than according to its period as in other countries.

7. When the empire of Charlemagne was divided between his three grandsons, in 843 A. D., the Italian portion, including Lombardy, fell to Lothaire (see Fig. 26, *History of Architecture and Ornament*, Part 2). Later, Lombardy was absorbed by Otho and became a part of the Holy Roman Empire. However, owing to constant disputes between the succeeding emperors and the popes, Italy suffered from almost constant internal dissensions and strife.

In the latter part of the 12th century, the emperor attempted to restrict the liberties of the cities in Northern

Italy. This led to the formation of the League of Lombardy, which consisted of twenty-three cities that united and declared the right of electing their own magistrates and making their own laws. The emperor then formed an opposition league of opposing cities, and between them war existed for 9 years. In 1176, the emperor acknowledged the right of the republics to govern themselves.

8. The most important of these Italian republics were Florence and Venice. The glory of Venice began during the Crusades, as many of the crusaders passed through there and traveled thence by sea to Palestine. The ships brought back silks, spices, and jewels from the Orient, and Venice became one of the richest cities of Europe.

Florence grew strong through the commercial spirit of her citizens. There were large manufacturers of silk and woolen goods and jewelry. Many of the citizens followed banking as a profession, and their gold coin, which was called a *florin*, and was first coined in 1252, became the standard coin of Europe.

One of these Florentine families of merchants, Medici by name, rose to great prominence in Florentine politics, and finally Lorenzo de Medici rose to the head of the government and was sole ruler of Florence from 1478 until his death in 1492. His splendid patronage of all branches of the fine arts gained for Florence the reputation of being the most artistic city in Europe. De Medici collected manuscripts, which he deposited in the public library, and purchased many pictures and pieces of sculpture by the most prominent artists of the age. About this time war with France brought into Italy Charles VIII, Louis XII, and Francis I, three successive kings of France, and the art treasures and manuscripts awoke in these sovereigns the desire for similar things in France. This Medici family afterwards gave eight dukes to Tuscany, two queens to France, and four popes to the Vatican, so that its rise to prominence affected the political and historical conditions not only of Italy but also of France for many generations.

CHARACTERISTICS

9. Renaissance architecture was the characteristic style throughout civilized Europe during the 15th and 16th centuries. It was a deliberate break in the system of designing that had characterized the buildings up to this time. The nature and requirements of the materials no longer fixed the conditions of the design, but the materials were forced to fulfil conditions imposed on them by the classic designs. The leading characteristic of the style was the classic orders used decoratively, as had been done by the Romans, as well as structurally, as were the columns and piers during the Gothic period. Buildings erected for modern uses were designed in the classic style of the temple and basilica; but as the style developed, many new and pleasing arrangements of these classic orders were arrived at, so that a style was finally evolved from which grew all other styles down to the present day.

10. In Italy, where the movement started in the 15th century, there were many skilful jewelers, goldsmiths, silversmiths, and other craftsmen that naturally aided in the expansion of the Renaissance ideas. On account of their generally acknowledged good taste, architects frequently consulted these craftsmen and in many cases became their pupils for the purpose of acquiring experience in design. Therefore, when buildings came to be designed by men that had received their training largely under jewelers, goldsmiths, painters, and sculptors, it is not strange that finished results were given more consideration than the principles of construction that led to the end. The Italian schools of painting also affected the buildings in this respect, as they created the tendency to consider buildings as works of art instead of structural problems.

Generally speaking, there was a tendency to combine the Roman designs with the Gothic construction. The body of the walls and the decorative facing were one and the same thing constructively, because the architects of the period did not perceive that the Roman architecture that they had

learned to admire was simply a shell over a concrete filling. The Renaissance architect therefore continued to build walls of cut stone and bonded exterior details well into the body.

During the better periods of Gothic art, each stone was finished and carved in the shop before it was brought to the building—a method that developed a high degree of craftsmanship among the masons and compelled the sculptor to suit each piece of stone to the decoration it was to receive. During the Renaissance, however, the carving was executed after the stones were in the building, and the joints in the stonework could not therefore be arranged as best suited the architectural conditions.

11. Architectural compositions were considered more as a picture of masses and lines than as structures for a utilitarian purpose, as they were often designed by men whose training had been under painters and workers in the precious metals. Many of the Roman palaces designed under these conditions present a stately appearance, where the pilasters, friezes, cornices, etc., are used simply as elements of a line composition to divide the façade of the building into pleasing proportions. For this reason, it is not fair to state that Renaissance architecture was purely imitative, for new and original features were introduced and architecture came to be more individualized and less local or national in character. Many architects invented combinations that characterized their work and thus established styles or systems of designs that were followed by their pupils and admirers for several generations.

12. The Renaissance architects unhesitatingly borrowed the Byzantine treatment of the dome, but increased its exterior prominence by raising it high on the drum, in which large windows were inserted to illuminate the interior. They also introduced into wall treatment massive rusticated masonry, wherein the actual roughness of the stone was made an architectural motif, as in Fig. 1; whereas, heretofore, classic walls had been of smooth stone or overlaid with rich marbles.

FIG. 1

In decorative details, great innovations were made. Bronze gates, rich grilles, lamps, and rails of elaborate metalwork were introduced, and wall decorations with motifs introduced from the classic, Gothic, and Saracenic schools characterized the interiors.

The ribbed vaulting of the Gothic architects was abandoned soon after the Renaissance movement, and the old Roman method with the solid arch was revived. This did not occur in actual construction, however, so much as in decorative form, for instead of the solid-concrete vault of the Romans, the Renaissance architects covered many of their halls and staircases with richly decorated, semicylindrical ceilings, which were simply plastered on a wooden framework.

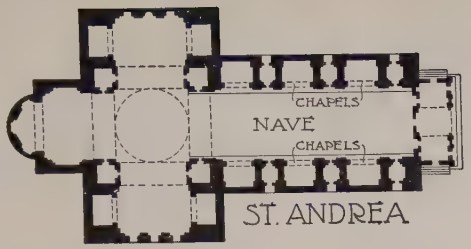
ANALYTICAL STUDY

13. Before considering the examples and characteristics of the style in each country, a comparison should be made between the characteristics of the Renaissance and those of the Gothic. Although several of the most imposing cathedrals of Europe were erected during the Renaissance period, the style found its most luxurious expression in municipal structures, palaces, country residences, and elaborate fronts of town buildings and monuments of civic improvement.

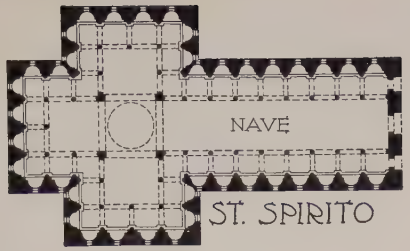
PLANS

14. Gothic plans were irregular and were composed of a multitude of parts, tending to create a feeling of largeness. They included towers, spires, turrets, etc., and all passages and apartments were as far as possible vaulted in stone, except in the minor structures. All Renaissance plans are symmetrical and are proportional, so that each part bears a certain relation to every other part. Few parts, simply arranged, tend to make the buildings appear small. (See Fig. 2.)

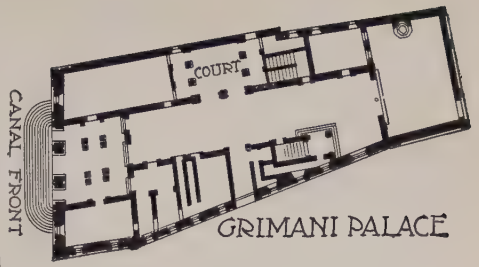
In the Gothic period, interiors of churches were broken into chapels and numerous subordinate details, and were


CHAPELS
NAVE
CHAPELS
ST. ANDREA

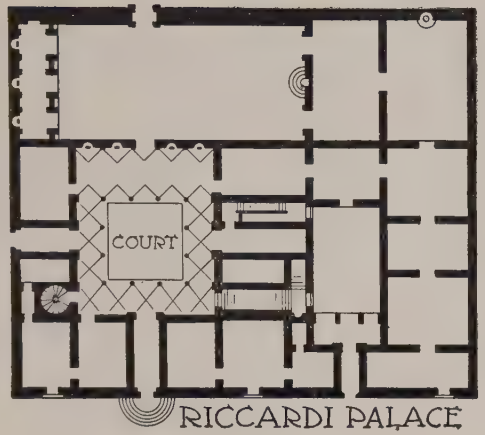
(a)


NAVE
ST. SPIRITO

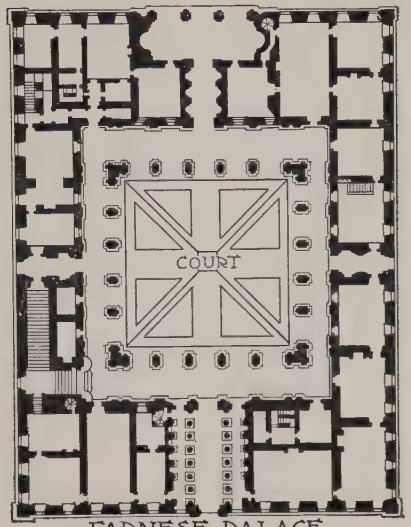
(b)


COURT
CANAL FRONT
GRIMANI PALACE

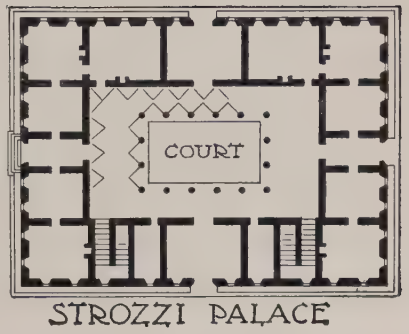
(c)


COURT
RICCARDI PALACE

(d)


COURT
FARNESE PALACE

(e)


COURT
STROZZI PALACE

(f)

FIG. 2

covered with vaults or open timber roofs; whereas, the Renaissance churches were planned on Roman lines and were covered with domes and barrel vaults. The Renaissance church plan seldom includes more than three or four compartments, and its grandeur is produced by spaciousness and decoration.

WALLS

15. Gothic walls were built of rough masonry, and consisted of small stones laid in irregular courses, with cut ashlar facings at the angles. The gables were steep and were richly ornamented. Renaissance walls were of ashlar masonry throughout, which, in the lower stories, was sometimes heavily rusticated, as shown in Fig. 1. The stones were large, uniform in size, and laid in regular courses. Gables gave way to low pediments and semicircular vault ends, simplicity, and breadth of style (see Fig. 3).

ROOFS

16. The roofs in the Gothic period were steep and pointed, in order to cover the vaulting. The vaulting added richness to the interior through its multiplicity of ribs, bosses, and pendants. Open timber roofs, candidly displaying their construction in richly carved details, were used in domestic architecture, and chimneys, spires, turrets, and towers contributed to establish an intricate and picturesque roof line.

Renaissance roofs were low and flat, following the slope of the classic pediment. The vaulting was after the Roman pattern, that is, semicylindrical and without ribs. Square spaces were covered with a dome supported on pendentives, as in Byzantine structures, and the soffits were plastered and richly decorated in fresco. The dome on the exterior was raised in order to form a conspicuous detail in the external composition, so that in each instance there were virtually two domes, one for internal effect and the other for external effect. In Italy, the real slope of the roofs was

FIG. 3

hidden as much as possible, but in Northern Europe, it was made an element of the design.

COLUMNS

17. When used in the Gothic buildings, the columns were purely structural, witnout any fixed proportion of length to thickness. The capitals and bases were either simply molded or richly foliated, according to the period, and although the shafts were frequently clustered, they were never planted against a wall purely for decorative purposes.

Renaissance columns were designed after the five orders of classic architecture, which at this time became the rule for everything. Columns and pilasters were frequently appliquéd against the wall of a building like a buttress but purely for decorative purposes. Thus, façades came to be divided into three parts, namely, *basement*, *superstructure*, and *roof*, in the proportion of pedestal, column, and entablature of the order that was designed to stand against them, as shown in Fig. 3. The shafts were frequently rusticated, and they were often fluted, or wreathed with bands of foliage or fruit.

OPENINGS

18. Openings were placed wherever required in the Gothic period, without any attempt at symmetry or centering of one window over another. The windows were large, divided by mullions, and glazed in richly designed painted glass. The jambs were formed in receding planes, in the angles of which small circular shafts with carved capitals support a richly molded pointed arch.

Renaissance openings were symmetrically disposed throughout the façade, the doors usually being in the middle, while the windows were evenly distributed each side and one over another in the different stories. The windows were small in Southern Europe, and square or circular-headed, usually without mullions, while in Northern Europe, they were large and frequently possessed mullioned

FIG. 4

subdivisions. Instead of receding jambs, there was a projecting architrave molded and frequently carved, but designed on classic lines, with a pedimented or circular top (see Fig. 4).

MOLDINGS

19. Moldings in Gothic architecture were varied and capricious, consisting almost entirely of boltels and fillets arranged in any convenient manner, without rule or regulation as to size or order of repetition. The parapet, either traceried or battlemented, surmounted the wall in place of a cornice, and possessed little projection except in military architecture, where it was supported on corbels with machicolations between. Vertical features were very marked, and buttresses, pinnacles, and turrets united in giving the effect of verticality.

Renaissance architecture presents its symmetrically molded cornice as one of the essential details of every building. Where several orders were used in different stories, a separate cornice marked each story, while a larger and bolder cornice overtopped them all at the roof line, as in Fig. 5 (*a*). These cornices were molded according to the classic models, but new combinations were introduced. The carvings were not restricted to the classic designs, but partook of the foliated independence of the Gothic period. String-courses and sill-courses are strongly emphasized, while vertical elements are broken or suppressed, the general effect being seen in the classic horizontal tendency of the lines.

ORNAMENT

20. Stained-glass decoration in the immense traceried windows was characteristic of the Gothic style. The human figure carved life size in niches and along the jambs of the portals gave scale to the buildings and details, so that their relative sizes were at once apparent. Color as an exterior embellishment was attained by the use of marbles or natural

(*a*)

(*b*)

FIG. 5

colored stones—never by artificial means. Carving was grotesque in character and crudely executed, but in the best examples, it was decorative in character and in harmony with the construction. Pinnacles, buttresses, and arches were richly embellished when required, but were never introduced unless the structural conditions demanded them.

Stained glass in the Renaissance was almost unknown. Opaque color was used for interior wall decoration, and elaborate frescos of religious and allegorical subjects, by the most prominent artists of the age, were introduced in all the principal buildings.

Graffito decoration, consisting of colored and roughly scratched plaster, as shown in Fig. 5 (*b*), was sometimes used on the exteriors. The human figure was rarely carved in its natural size, but was usually executed much larger. Architects of this period were frequently skilled painters, sculptors, and metal workers. Michelangelo, for instance, designed the dome of St. Peter's Cathedral, at Rome, painted the celebrated ceiling in the Sistine Chapel of the Vatican, and also executed many of the decorative sculptures that adorn the grounds.

21. In studying the Renaissance as it developed in each country, particular note should be made of the different influences that affected the style. With this period a more intimate knowledge is gained of the architects that are responsible for the designs. The influences under which these architects studied and worked affect the results quite as much as the climatic, religious, and political characteristics of the country.

In the 17th century, after the Renaissance style had become as servile an imitation of ancient Rome as possible, a reaction for originality set in and a lot of meaningless detail was introduced that caused a rapid decline in the style. Fronts of buildings were built on sinuous curves instead of straight, columns were placed in front of pilasters, and pediments were broken in the middle and sculptured figures placed within.

ITALIAN RENAISSANCE

22. Renaissance architecture in Italy may be divided into three separate styles of design, each partaking of the same general characteristics, but differing from one another according to differences of local influences.

FLORENTINE RENAISSANCE

INFLUENCES

23. Geographical.—Florence consisted of a group of cities made up of a central governing city and a number of smaller cities, over which the chief one held power.

24. Geological.—In Tuscany were quarries of granite and marble, and the monumental character of these materials affected the style in this community.

25. Climatic.—Florence being located in a bright and sunny country and quite warm during the summer, the windows in its buildings had to be made small.

26. Religious.—The Church, which was always a powerful factor in Renaissance architecture, was represented in Florence by Savonarola, a Dominican preacher and great reformer. His policy influenced the city materially, and although he was suppressed by the pope, his influence on the minds of the people continued to be felt.

27. Political and Historical.—The independent cities of Italy formed leagues during this period and one city ruled over the others. Pisa became subject to Florence in 1406, and the latter city soon became the dominating power in Italy, as well as the leading city in art and literature. In 1494, Charles VIII of France invaded Italy and took possession of Florence.

FIG. 6

CHARACTERISTICS

28. Florentine Renaissance palaces are usually built of massive blocks of rustic masonry, which gives them a fine, rugged dignity that characterizes the style. They are built around interior courts, the interior walls resting on columns and thus forming an arcade on four sides of the court, similar to the cloisters in the monasteries (see Fig. 6). There are no columns or pilasters on the exterior, and the façades in consequence are particularly severe. A massive cornice crowning the walls is the only exterior detail of a classic character, except where columns or pediments are used in the windows.

The Florentine school, or system, of Renaissance design is expressive of formidable dignity and structural severity on the exterior, but displays the most delicate appreciation of refinement and luxury in the treatment of the court elevations and the arrangement of the interior plan. Large rooms, high ceilings, and broad, unbroken wall surfaces, richly decorated with frescos and arabesque designs, are characteristic in all the Italian schools of Renaissance design, but in Florence particularly this interior treatment is to be seen at its best, on account of the omission of columns and pilasters as the principal feature of interior decoration.

29. There are three types of window: the *arched type*, in which a column divides the opening vertically and supports the ends of two smaller arches under a main rusticated arch, as in the upper stories of the Riccardi Palace, Fig. 1; the *architrave type*, where the sections of the openings are molded and a pediment, or cornice, supported on consoles covers the top, as in the lower story of the Riccardi Palace; and the *columnar type*, where a column, or pilaster, flanks each side of the opening and supports an entablature, or pediment, as in the Pandolfini Palace, Fig. 10.

EXAMPLES

30. The architectural examples in the Italian Renaissance style will be grouped under the names of the architects

FIG. 7

that were responsible for the establishment of each particular style or school of design. As has been stated, many of these architects acquired their training under goldsmiths and painters, and the influences of this training is more or less evident in their works.

31. Brunelleschi.—Filippo Brunelleschi, who studied at Rome, built the dome over the cathedral at Florence. (See Fig. 36, *History of Architecture and Ornament*, Part 3.) This was the first use of the dome as an external feature. Although the dome is a classic detail and Brunelleschi gave much time to the study of the construction of the Pantheon and other buildings at Rome, the result of his work on the Florence Cathedral shows strong Gothic influences. The dome is octagonal in plan, is pointed instead of semicircular, and is supported on eight main ribs and sixteen intermediate ones.

32. St. Spirito Church.—The church St. Spirito was built on the plan of a basilica. The aisles were carried around the transepts and choir, as shown in the plan, Fig. 2 (*b*), and the building itself was covered with a wooden roof. The interior is interesting because it is probably the first in which the columns of the nave were placed under small, individual fragments of an entablature, from which the nave arches sprung (see Fig. 7). This feature became prominent in many later Renaissance interiors in other countries.

33. Riccardi Palace.—The Riccardi Palace, Fig. 1, completed in the year 1430, by Michaelozzo, a contemporary of Brunelleschi, was the first residence erected in the Renaissance style. It is an imposing structure with a rectangular façade two stories in height, standing over a massive basement, and crowned with a classic cornice of almost excessive proportions.

The general exterior appearance of these palaces is somewhat fortress-like and forbidding, but they were nearly always built around an interior courtyard, which was light

FIG. 8

and cheerful and was surrounded by a vaulted colonnade on three and sometimes on four sides. They afforded shady, open-air resting places within the palaces and added much to the comforts of the buildings as residences, besides materially enhancing their architectural effect.

34. Pitti Palace.—The Pitti Palace, Fig. 8, by Brunelleschi, embodies the same ideas on a much larger scale, but the cornice is too small for so massive a building. Here, the wall surface is broken by heavy rusticated pilasters in two stories, while the windows on the garden wings are small and unobtrusive. The windows on the court, however, are exceedingly wide, occupying, with their flanking columns and pilasters, the full space between the rusticated orders.

35. Leoni Battista Alberti was a deep student of classic literature, a writer, a poet, and a musician. He, with Brunelleschi, literally started the Renaissance style in Italy. He wrote a treatise on architecture that materially influenced the minds of his students and followers and did much to popularize the style. His design of the Ruccellai Palace is the first Renaissance building in which superimposed pilasters were used on the exterior. This structure is lighter in style and more refined in character than the Pitti Palace (Fig. 8) of Brunelleschi, but the crowning cornice is so much smaller in comparison to the front of the building that much of the dignity of the composition is lost.

36. Church of St. Andrea Mantua.—St. Andrea Mantua, the plan of which is shown in Fig. 2 (*a*), is important as a type from which many Renaissance churches were modeled. It possesses no aisles, but its broad nave is crossed by a transept, and chapels alternating with entrances are grouped along the sides. The nave is covered with a coffered ceiling in the form of a barrel vault springing from a classic entablature supported over Corinthian pilasters. The pilasters stand on pedestals and continue into the transept. Over the intersection of the transept and nave rises a magnificent dome on a tall drum, which is pierced with windows to light the interior.

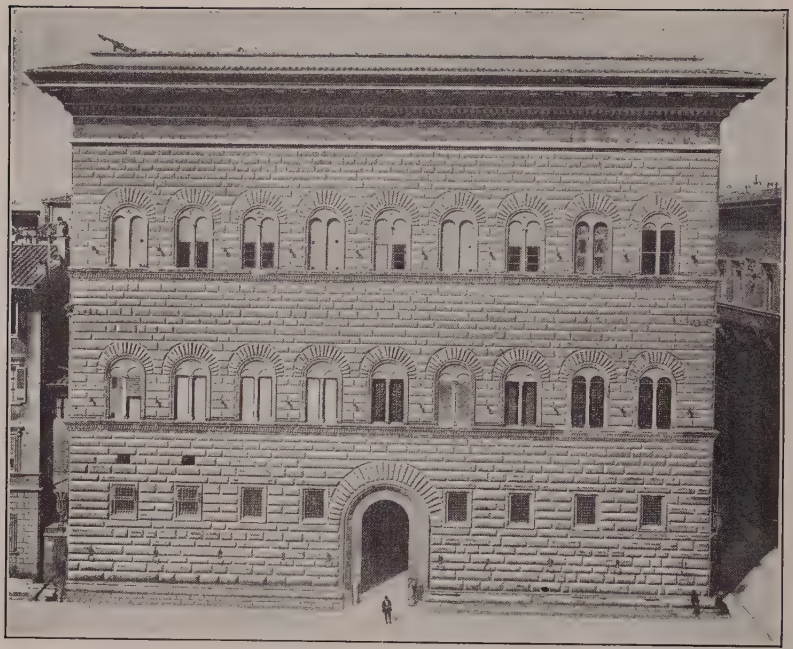


FIG. 9

FIG. 10

37. Strozzi Palace.—The Strozzi Palace, Fig. 9, erected in 1490, may be taken as a typical example of the Florentine style of Renaissance design. The windows of the first story are protected by heavy iron gratings, while the entrance is guarded by a heavy iron gate.

This fortress-like arrangement is due to the fact that these palaces were part castle and part residence. During the frequent local wars of this period, it was often necessary for the nobility to retire within their palaces and defend them against the attack of an invading army. The exterior was therefore made very formidable, not only in appearance, but also in fact, while the elevations on the court present an appearance much more in accordance with the idea of domestic life and household comforts.

The broad entrance door in the center of the façade was a carriage entrance, or driveway, into the court, and from this court, under the shade of the surrounding arcade, several doorways gave access to different parts of the palace. The upper stories of the building, though executed in the same style of heavy rustic ashlar, were provided with more liberal arched window openings, which were divided by a central columnar mullion and two smaller arches extending from the mullion to the jamb on each side.

38. Pandolfini Palace.—The Pandolfini Palace, Fig. 10, designed by Raffael, was built over half a century later than the Riccardi. The rusticated work is here confined to the portal and the quoin stones on the angles. Classic details appear on the exterior of buildings about this time, and in this example take the form of pilasters at the sides and of pediments over the window openings, while a pedestal supports the sill.

39. Court of Vecchio Palace.—The court of the Vecchio Palace, Fig. 6, was remodeled in the 16th century, when the Renaissance was approaching its most classic period. The columns surrounding the open central space were elaborately carved and ribbed, while the soffits and side walls were painted in elaborate and brilliant designs.

ROMAN RENAISSANCE

INFLUENCES

40. Geographical, Geological, and Climatic.—The geographical, geological, and climatic influences of the Roman Renaissance period are the same as those of Central Italy under the heading Italian Romanesque, *History of Architecture and Ornament*, Part 2.

41. Religious.—Charlemagne in 773 A. D. had confirmed the temporal power of the pope by defending him against the Lombards. The Lombards had been defeated by Pepin, the father of Charlemagne, and their territory, known as Lombardy, had been turned over to Pope Stephen III. In return, Charlemagne was crowned by Pope Leo III as Emperor of the Holy Roman Empire. The successors of Charlemagne inherited the title of emperor and they evidently intended to transform the title into real authority; whereas, the later popes insisted on the independence of the papal states, which was finally acknowledged by Emperor Rudolf I of Hapsburg.

In 1378, great scandal in the church was caused by a dispute over the election of the pope. Each of two rival candidates claimed to be elected, and one established himself at Avignon, France, while the other maintained his papal palace at Rome. This period is known in church history as the "Great Schism." The dispute was ended in 1415 by the general recognition of the Roman Pontiff, after which the popes assumed a very important temporal position as Italian princes, and during the 15th century, they greatly extended their possessions in Italy. A great palace was erected for them and was called the Vatican. At the present day, the Vatican is probably the most extensive palace in the world, containing as it does some twenty courts and 11,000 rooms, halls, and apartments. The popes were great patrons of literature and the arts and encouraged the erection of palaces and churches, the decoration of which

was entrusted to such painters as Raffael, Michelangelo, and others. A school was established for artists and artisans, who afterwards did much for the spread of the Renaissance both at home and abroad.

42. Political and Historical.—As a central government was recognized at Rome, fortified palaces were not necessary as in Florence. Rome was the center of the old classic traditions, and the remains of such structures as the Colosseum, the Pantheon, and the Fora gave impetus to the revival and at the same time furnished material for building purposes.

CHARACTERISTICS

43. As the Renaissance advanced, it was inevitable that the constant study of Roman architecture should lead to a closer imitation of classic details and eventually to an absolute copying of antique designs. Toward the close of the 15th century, correctness in the rendering of the ancient Roman forms came to be considered the chief of architectural virtues, and the orders became the principal resource of the architect. Externally the orders were freely used in the decoration of doors and windows and of the court arcades of the palaces. Frames around these openings and pediments over them were extremely elaborate, and cornices and moldings were profiled with the utmost care, while the balustrade was elaborated into a most intricate and ornate device, but always on strictly classic lines. This period started in Rome with the erection of St. Peter's Church and continued until a complete transformation was effected throughout the city.

The façades and courts of the buildings were designed as nearly as possible in the old classic style. The orders were used freely but without excessive elaboration, in consequence of which the Roman palaces present an effect of most dignified simplicity. An attempt at unity in design was developed later, when buildings were treated to appear as one story with pilasters extended the entire height of the

front, including two or three stories, and crowned by an entablature, including an attic story, as shown in Fig. 3. Superimposed orders were rarely used, and arched openings were sparingly introduced, except in tiers of arcades, as shown in Fig. 11, after the style of the Colosseum.

EXAMPLES

44. Bramante.—The first architect of note in the Roman Renaissance was Bramante, who was born in 1444, the year that Brunelleschi died. He was educated as a painter and was probably a pupil of Alberti. Though born in Florence, Bramante studied at Rome and his first practice was in Milan.

45. Raffael was a nephew of Bramante and was engaged on many buildings in and around Rome. He painted many interiors and executed the designs for the Pandolfini Palace, although it was not erected until 10 years after his death.

46. Bramante had many pupils and followers. Among them was Baldassare Peruzzi, who designed many buildings in Rome. His work was prominent for its finished detail in plan and elevation. He built the Mossimi Palace and the Villa Farnesia.

Antonio di Sangallo, another pupil of Bramante, erected the Farnese Palace, Fig. 4, which is considered a masterpiece of the Roman Renaissance.

47. Michelangelo, born in Florence, in 1475, was educated as a sculptor and painter. He executed many statues at Florence, and was called to Rome, in 1505, to execute the designs for a mausoleum for Pope Julius II. Later, he executed a bronze statue of the pope, which was erected at Bologna, and in 1508 he returned to Rome and painted the ceiling of the Sistine Chapel in the Vatican, a work that required many years. This decoration represents scenes from the creation surrounded by elaborate architectural settings, all painted in perspective to appear in relief. Late in life, Michelangelo turned his attention to

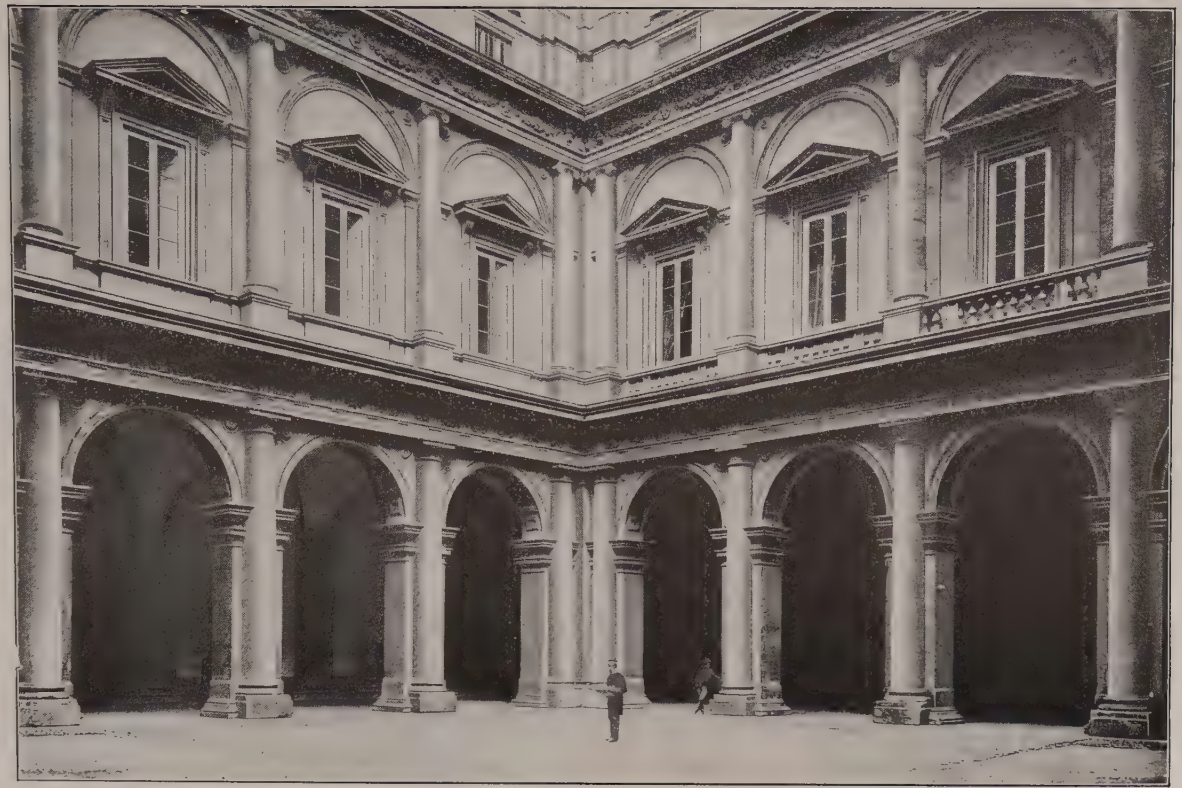


FIG. 12

architecture and among other buildings designed by him are the dome of St. Peter's, palaces of the capitol, the mausoleum at Florence, and the Laurentian Library at St. Lorenzo.

48. Vignola.—Giacomo Barozzio de Vignola was the author of a work entitled "The Five Orders of Architecture," which has been translated into nearly every language and which, as a universal authority on the Roman orders, did much to familiarize other students with classic details.

Up to the time of Vignola, the revival of classic art had succeeded in banishing every Gothic detail from Italian architecture, but the architects had not consented to a servile imitation of classic buildings. They were endeavoring to develop a new style as pure and elegant as the classic, but on the whole quite different from it. Vignola and his contemporary, Palladio, after pursuing a long and enthusiastic study of the old classic ruins and details, arrived at the conclusion that the classic style was the only true style and that it could not be copied with too great minuteness. Consequently, they measured the details and proportions of the ancient orders, and reduced architectural design to a problem in mathematics.

In Vignola's book on the five orders, not only did he fix the exact proportion of every detail and the profile and arrangement of every molding, but he established rules for the arrangement and proportions of superimposed orders and fixed on the Renaissance those principles which gave it a distinctive character. At the same time, however, he assured its eventual decay, as the human mind cannot be satisfied without progress, and when the main considerations of design are fixed with mathematical precision, designers will create all sorts of frivolous details in the effort to produce originality of effect. According to the rules of Vignola, superimposed columns were to be used in a fixed order from Doric to Composite, colonnades were to be spaced in certain fixed terms of the diameter of the columns, and no details not found in the ancient monuments were to be included in a design.

FIG. 12

49. St. Peter's at Rome.—Bramante, the first architect of St. Peter's, proposed to combine, in one design, the great dome over the Pantheon with the vaulting of the Basilica Maxentius (see Figs. 75 and 78, *History of Architecture and Ornament*, Part 1), and thereby erect a building that should exceed in size, elaboration, and structural complexity, any ecclesiastical edifice ever erected. The foundation for this great church was laid by Pope Julius II, on the 18th day of April, 1506. Bramante died 7 years later, but the building was continued at irregular intervals, under different architects until the year 1546, when Michelangelo was assigned to the work by Pope Paul III. Michelangelo completed the building with the exception of the dome, which was finished after his death in 1564, by Fontana. Michelangelo left a plaster model of the dome, from which it was completed according to his design. This dome is 140 feet in diameter and is poised on the top of a circular colonnade; it rises to a height of 405 feet above the church floor. As left by Michelangelo at the time of his death, St. Peter's was as harmonious a design as existed in the Renaissance style, but in 1606 the nave was lengthened, under orders of Pope Paul V, and the proportions were destroyed, as the dome became hidden on close approach, and the façade was tasteless and insignificant. (See Fig. 12.) The magnificent atrium, surrounded by the double colonnade, which was added by Bernini, in 1667, gives dignity to the approach, but does not compensate for the weakness of the design of the main façade.

50. St. Peter's is the largest church in existence. The central aisle, nearly 600 feet long and 83 feet wide, with its splendid paneled and gilded vault, together with the central space under the majestic dome presents one of the most majestic conceptions of the Renaissance. This interior, as shown in Fig. 13, however, is too gaudily colored for so stately a design. Elaborate carvings, brilliant frescos, and expanses of burnished gold are more suggestive of the interior of a pagan temple than of a Christian basilica, and

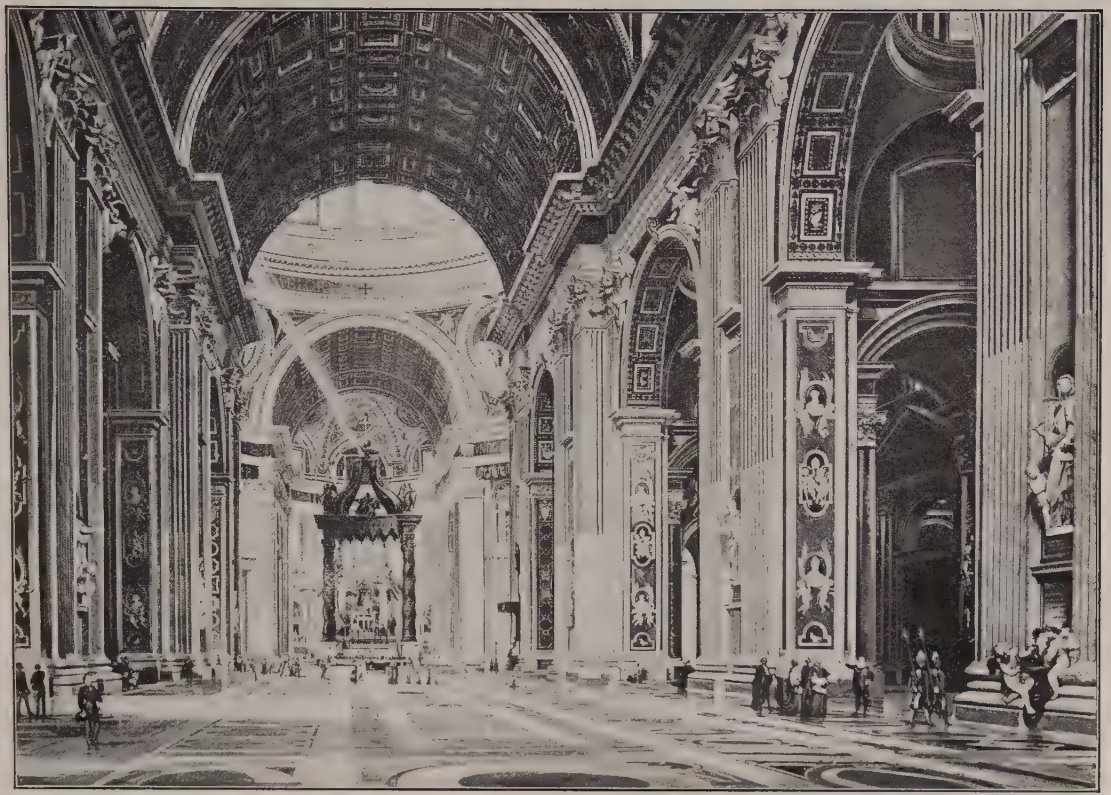


Fig. 13

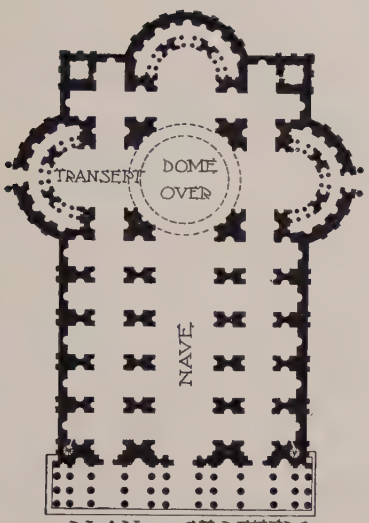
reveal the decline in taste toward the end of this great period, of a style that, borne on a tidal wave of popularity, swept over Europe and exhausted itself in the constant effort to approach a false ideal. At the advent of the Renaissance, the architects were compelled to exercise much ingenuity in order to combine the classic and Gothic forms, but with advanced study, their ingenuity declined and the practice of a servile copying of classic forms resulted.

St. Peter's Church is noble in its proportions, majestic in its conception, and gorgeous in its decorations, but at the same time its coloring is gaudy, its design is servile, and its style is inappropriate as a monument to the Christian faith.

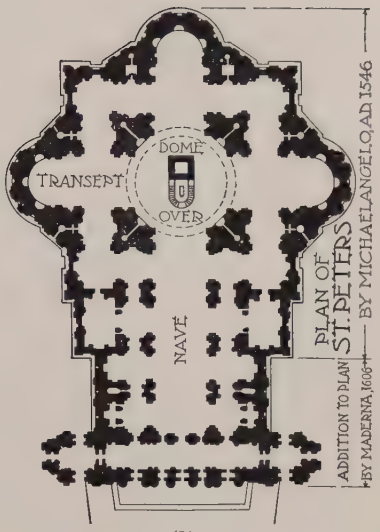
51. St. Peter's Cathedral at Rome was the most important building erected during this period, and many architects were engaged on the work. In 1506, Bramante made the first design, which presented a plan in the form of a Greek cross domed over at the intersection of the arms, similar to the Byzantine plans. In 1513, Sangallo and Raffael were engaged to superintend the work, but a year later Bramante died, and in 1520 Raffael died, and in 1536 Peruzzi, who was appointed to succeed Bramante, also died. Before Raffael's death, a division of opinion had arisen as to the advisability of changing the Greek-cross form to a Latin cross, Raffael favoring the latter [see Fig. 14 (*a*)].

In 1536, Antonio di Sangallo succeeded as architect, and presented a revised plan with a central dome, many orders, and a lofty campanile, Fig. 14 (*d*). Sangallo died in 1546, and Michelangelo was appointed architect. He rejected the plans of Sangallo, restored the design to the Greek cross, and simplified the aisles, thus destroying entirely the scheme of Raffael to give scale to the interior.

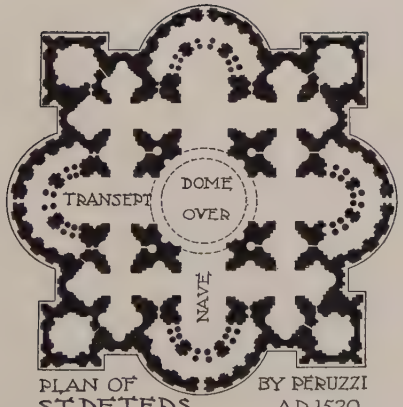
Michelangelo completed the design for the dome and executed a model of it (see Fig. 15). The drum of the dome was finished at the time of his death, in 1564, and the dome itself was carried out in accordance with Michelangelo's model by Giacomo della Porta and Domenico Fontana.



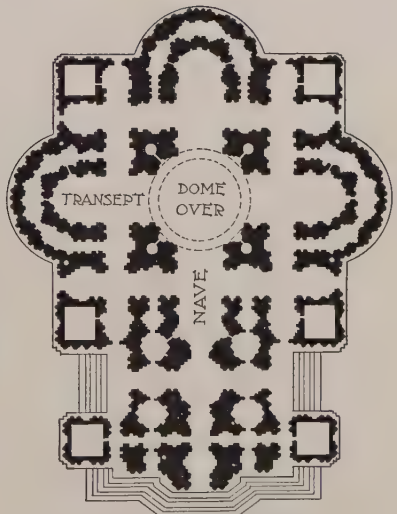
PLAN OF ST. PETERS
BY RAPHAEL, AD. 1513.
(a)



(b)



PLAN OF ST. PETERS BY PERUZZI A.D. 1520.
(c)



PLAN OF ST. PETERS
BY SAN GALLO, AD. 1550
(d)

FIG. 14

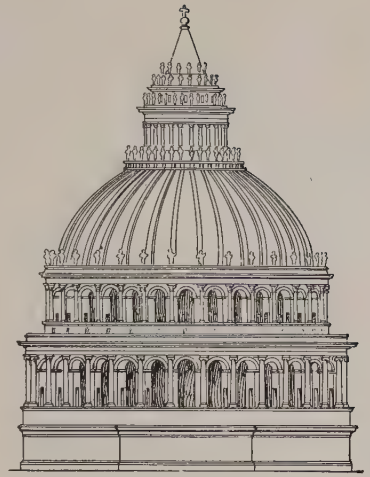
Vignola was appointed architect after Michelangelo's death, and added the cupolas on each side of the dome.

In 1605, Carlo Maderno lengthened the nave to form a Latin cross and erected the present insignificant façade. Finally, in 1624, Bernini erected the colonnade enclosing the plaza.

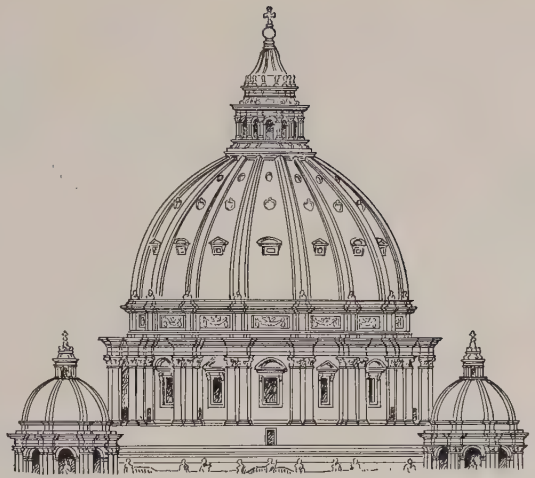
52. Church of St. John Lateran.—The church of St. John Lateran, in Rome by Galilei, erected in 1734, Fig. 3, shows on its exterior the application of the orders in excessive proportions, as first practiced by Palladio at Vicenza. The design is a very powerful one, however, combining, as it does, a colossal order with two smaller orders in superposed loggias. The composition is marred by the excessive size of the statues which crown it, but, taken all together, this façade may be considered as one of the masterpieces of the later Renaissance. The portico is 33 feet deep and 196 feet long, and the open loggia above it is one of the finest in Rome.

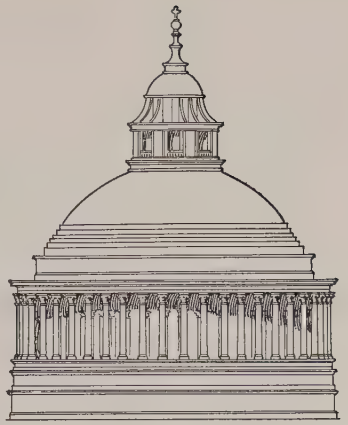
53. Roman Palaces.—The palaces of Rome are classed among the finest in Europe. Their design is not so heavy as those of Florence, nor so delicate as those of Venice, but the architects of the Roman Renaissance period have, by means of a diligent study of the ancient monuments, reproduced in the palatial residences of their aristocrats the most imposing features of the tombs and temples of their pagan ancestors.

Roman palaces were usually of great size and were built around large courts, with arcades of classic model in two or three stories. On the street front, the structures were crowned with a rich cornice proportioned to the height of the building, in the relation of entablature and column. The orders themselves were used but rarely on the exterior, and effect was obtained by careful proportioning of the stories and in the form and distribution of the openings. The first story was given up to suites of sumptuous apartments, elaborate halls, reception rooms, etc., the walls and ceilings of which were decorated with magnificent frescos by the

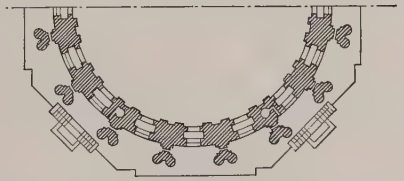


BY SANGALLO.

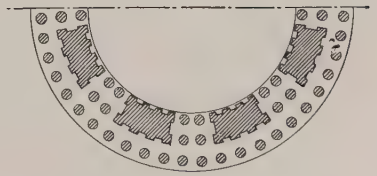




DESIGNS
FOR THE
DOME OF ST. PETER'S.



PLAN OF PERISTYLE OF EXISTING DOME
BY MICHAELANGELO.



PLAN OF PERISTYLE BY BRAMANTE.

FIG. 15

greatest painters of the day, and groups of statuary and bas-reliefs were disposed in the courts and vestibules and in the wall niches of the principal rooms of these princely dwellings.

54. Farnese Palace.—The finest of the palaces, the Farnese, built by Sangallo in 1530, is shown in Fig. 4. It is an immense building, 260 ft. × 192 ft., whose rectangular plan and simple elevations are given dignity and impressiveness by the careful proportioning and arrangement of the window openings and by the treatment of their details. The lower story is very plain, consisting merely of a row of square-headed openings in a plain masonry wall surface, which is relieved at the center by an immense carriage entrance to the beautiful court within. The windows in the upper stories are flanked each side by three-quarter columns, which support a pediment over each opening, and the whole structure is surmounted by a magnificent cornice, designed by Michelangelo, which is worthy of its position on the finest palace in Rome.

55. The interior court of the Farnese Palace, Fig. 11, is a magnificent enclosure over 125 feet square and is surrounded on four sides by a deep colonnade, over which the second story of the palace extends. The colonnade is somewhat on the style of the Colosseum (see Fig. 83, *History of Architecture and Ornament*, Part 1), with its half columns supporting an entablature, but the projecting imposts impair the composition in the first story, as they have the appearance of cutting into and weakening the columns. Like all the Renaissance palaces, the court elevations of the Farnese are considerably more elaborate than the exterior fronts, but the simple treatment of the entire design places it in the lead as one of the most successful buildings in the Renaissance style.

56. Giraud Palace.—The Giraud Palace, Fig. 16, is one of Bramante's later works, in which the orders are introduced in the second and third stories. The basement, however, is plain and severe, somewhat after the style of the Florentine palaces.

FIG. 16

FIG. 17

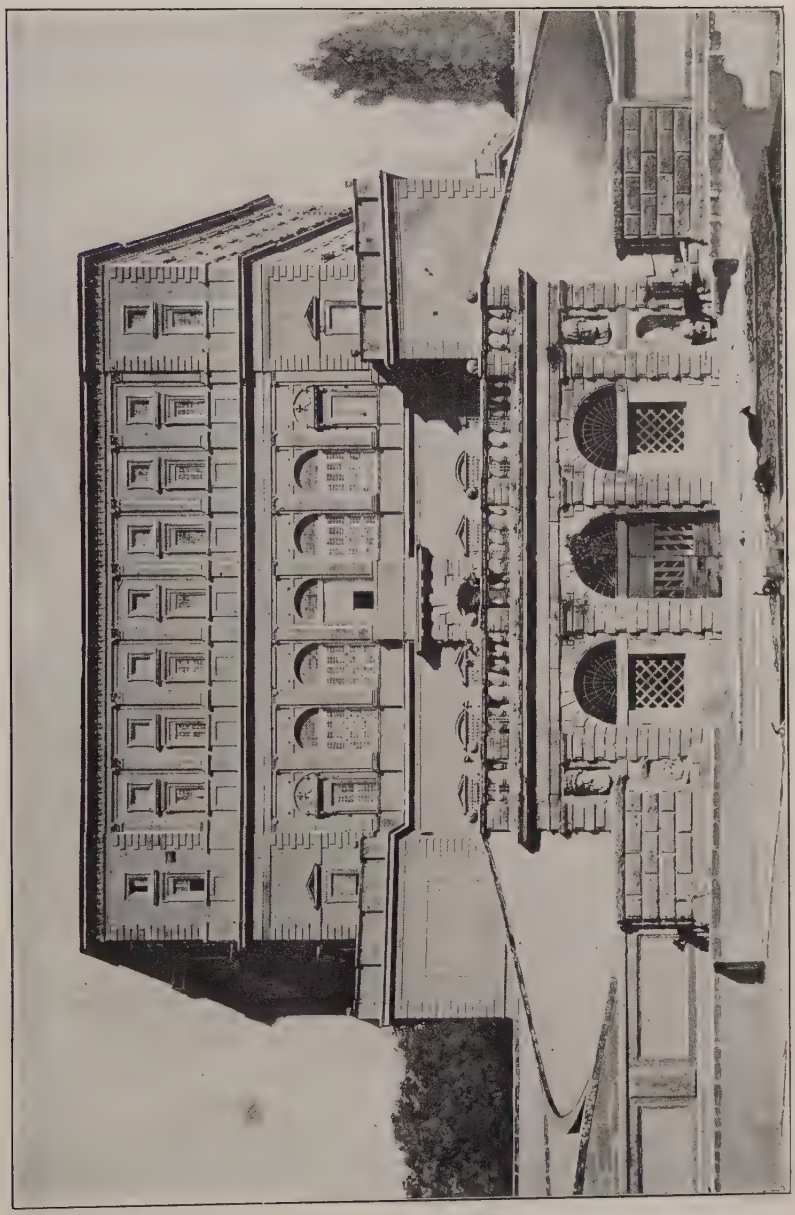


Fig. 18

57. Cancellaria Palace.—The Cancellaria Palace, Fig. 17, has the characteristic court surrounded by a colonnade, but in this case the colonnade is carried out through two stories. The upper story supports an attic in which pilasters face the walls over the columns below in superimposed orders according to the rules of Vignola.

58. Palace Caprarola.—Vignola's greatest work was undoubtedly the Palace Caprarola, Fig. 18, about 30 miles from Rome. The plan was pentagonal in outline, enclosing a circular court. Each of its five sides was 130 feet long and 90 feet high, while the court was 65 feet in diameter. This pentagonal form of plan was used to give the palace a fortress-like appearance, as all citadels at that time were pentagons. Above the terrace on which it is built, the palace rises in two grand stories of orders, the lower one being arcaded and the upper one including two stories of windows. Vignola also designed many other important buildings in Rome.

59. The Villa Medici.—When these palaces were built on the outskirts of the city, or beyond the municipal limits entirely, the courts were sometimes dispensed with, and great care was given to the laying out of a park or garden on one side of the palace, which should afford a pleasing outlook from the principal rooms.

In Fig. 19 is shown the garden front of the Villa Medici, erected in 1540 by Lippi. The entrance, with its central arched and flanking trabeated openings and its supporting columns, is a typical detail of the Roman school of the Renaissance, which was much copied in many subsequent buildings erected in other countries. The walls of this façade are tastefully decorated with numerous bas-reliefs of allegorical subjects, and are indented with niches for the reception of statues and busts. The window openings are few and comparatively small, as they face the southwest and the rays of the tropical sun are not desired within. This lack of windows accounts for the surface decoration of the walls proper and the consequent originality of the design.

FIG. 19

VENETIAN RENAISSANCE

INFLUENCES

60. Geographical.—The importance of Venice was always due to her geographical position being especially advantageous to Oriental trade. This trade brought wealth and consequently architectural development.

61. Geological.—Venice is practically built over the water instead of over the land. Its palaces and churches are erected on piles driven in a shallow lagoon, and the means of communication being through canals instead of streets, it presents an entirely different condition from any other community. The structural problem beginning at once with the peculiarity of foundations had an important influence on the design of its edifices.

62. Climatic.—The climatic conditions favor an outdoor life, as Venice is very warm in summer, though tempered by sea breezes; yet it is sufficiently cool in winter to require artificial heating of interiors. The former condition tends to the picturesque treatment of the façades, as they are reflected in the canals, and the introduction of much color, while the latter renders the roof treatment more conspicuous in chimneys than is found in other Italian cities.

63. Religious.—Venice was more independent of the pope than other cities, and always maintained a strong loyalty to the state. Tolerance of religious forms in Venice is evidenced by the erection of a Greek church during the Renaissance period.

64. Political and Historical.—During the 15th century, Venice conquered the surrounding country and appointed Venetian governors, thus strengthening her republican form of government. Many wealthy families arose to prominence and a great rivalry existed in the erection of handsome palaces along the Grand Canal. These palaces were not

(*a*)

(*b*)

FIG. 20

fortresses as in Florence, but were the residences of prominent citizens that had acquired greath wealth through Oriental trade and manufactures.

In 1453, Constantinople was taken by the Turks and the Oriental trade was undermined. In 1486, the new route from Europe to India was discovered by Diaz and much of the Indian trade was thus diverted to Portugal. As a result of this, Venice was at war with the Turks throughout the 16th century, and eventually all her possessions, except Northern Italy, were taken from her.

CHARACTERISTICS

65. The Renaissance movement affected the architecture of Venice very differently from other Italian cities. The Venetians had developed a very beautiful architecture during the Gothic period, and being more isolated from Rome, they were not so much influenced by classic traditions as were the people of nearer cities like Florence. Therefore, instead of adopting the classic forms at once, there was a period of transition, during which the two styles were mingled.

The architecture of Venice was of a lighter character than the rustic styles of Florence or the severely classic styles of Rome. Columns and pilasters were used freely, but the windows were arranged in groups instead of being evenly distributed across the façade. A favorite grouping was one where the openings were arranged in the middle of the front with considerable areas of flanking wall on each side, as in the lowest stories of the buildings shown in Fig. 20. The façades were comparatively flat, owing to the scarcity of land and the frontage being on the line of the canal, but monotony was avoided by the grouping of the windows, the introduction of projecting balconies, and the subdivision of the stories by cornices and balconies.

Late in the period, Venice, like other cities, followed the classic proportions of Vignola very closely and introduced little detail or decoration that did not have a classic model as its prototype.

FIG. 21

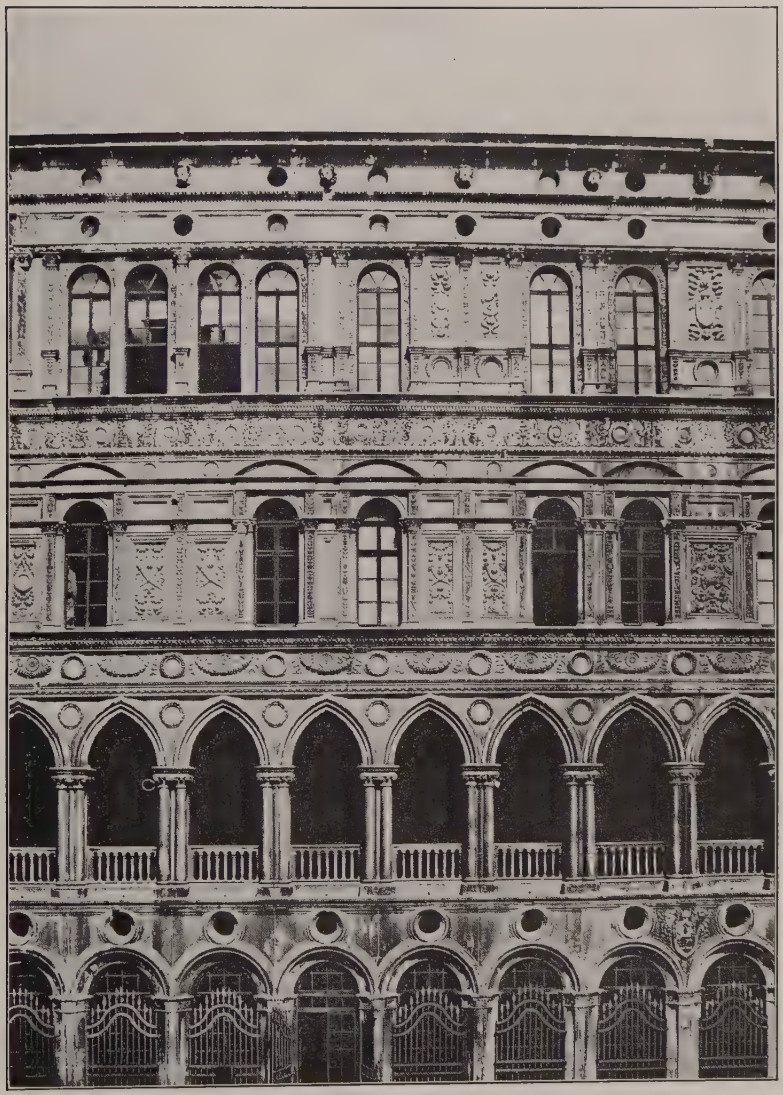
EXAMPLES

66. Venetian Architects.—The principal architects of the Venetian school were Sansovino and his immediate successors. Sansovino built the staircase in the court of the Ducal Palace, Fig. 23, the Zecca, or Mint, and the church of St. Georgio del Greci. He commenced the library of St. Mark, Fig. 21, but this structure was finished after his death by one of his successors.

Sansovino was succeeded by two rivals, Scamozzi and Palladio. The former finished the library of St. Mark and erected numerous churches and palaces. He possessed little originality, however, and Palladio, with his transcendent talent, finally obtained the lead.

Palladio was an author as well as an architect. He carefully measured the Roman antiquities and published drawings of them in a book on architecture, which did much to influence other European designers. His designs were mostly erected in brick and stucco, the lower story being rusticated, as in the Florentine examples.

67. Ducal Palace.—The great undertaking of this age was the rebuilding of the court of the Ducal Palace, Fig. 22, by Antonio Rizzo, in 1486. The lower story is particularly pleasing. The piers are octagonal prisms, in the faces of which panels are sunk, thus giving lightness to the details without detracting from their strength. The pointed arcade in the second story is not so pleasing, and shows how the lingering traditions still affected independent Venice, when Rome had given herself up entirely to the classic revival. The upper stories are characteristically Renaissance. The broad belts of friezes carved in ornamental sculpture cease to appear as copies of classic forms and readily proclaim themselves as ornamental wall spaces between the stories. The pilasters flanking the windows are not the pilasters of ancient Rome, but a Renaissance development that is ever appropriate to its plan. The giant stairway, Fig. 23, was completed by Sansovino, in 1554.



221

FIG. 22

68. Library of St. Mark.—The library of St. Mark, Fig. 21, commenced by Sansovino in 1536, is undoubtedly the masterpiece of this architect. It consists of an open arcade in the Doric order on the ground floor, above which is an Ionic arcade under an entablature of most exaggerated proportions. This was necessary in order to permit the frieze to be pierced with a range of small windows. There seems also to be too great a profusion of sculptured ornament, but notwithstanding these defects, there is a grandeur in the range of its twenty-one arches and the boldness of its crowning members that is impressive. This structure is 270 feet long on the plaza facing the Ducal Palace and is 45 feet deep on the end shown in Fig. 21.

69. Vendramini Palace.—The Vendramini Palace, Fig. 20 (*a*), commenced in 1481 by Lombardo, is one of the most beautiful palaces in Venice. It is one of the earliest buildings in Italy where engaged columns are used to divide the façade. The lines of its composition are vigorous and stately, and its broad arched and mullioned windows, separated by engaged columns, established a type of large-windowed and vigorously modeled façades that later architecture developed but never surpassed. The treatment of the arched heads of the windows is suggestive of Gothic influence, although the mullions and other columns are derived directly from Roman models. The grouping of the windows toward the center of the building and leaving a flanking wall mass on each side, is a typical Venetian feature, which is also traceable in some of the Gothic designs.

70. Cornaro Palace.—The Cornaro, Fig. 20 (*b*), commenced in 1532 by Sansovino, is similar to the Vendramini Palace. However, the openings are smaller and the first story is higher, and is built of rusticated stonework somewhat after the Florentine style.

71. Pesaro Palace.—The Pesaro Palace, Fig. 5 (*a*), designed by Longhena, in 1650, is a most dignified composition, although there is no doubt that the façade is overornamented. It belongs to the later period of the

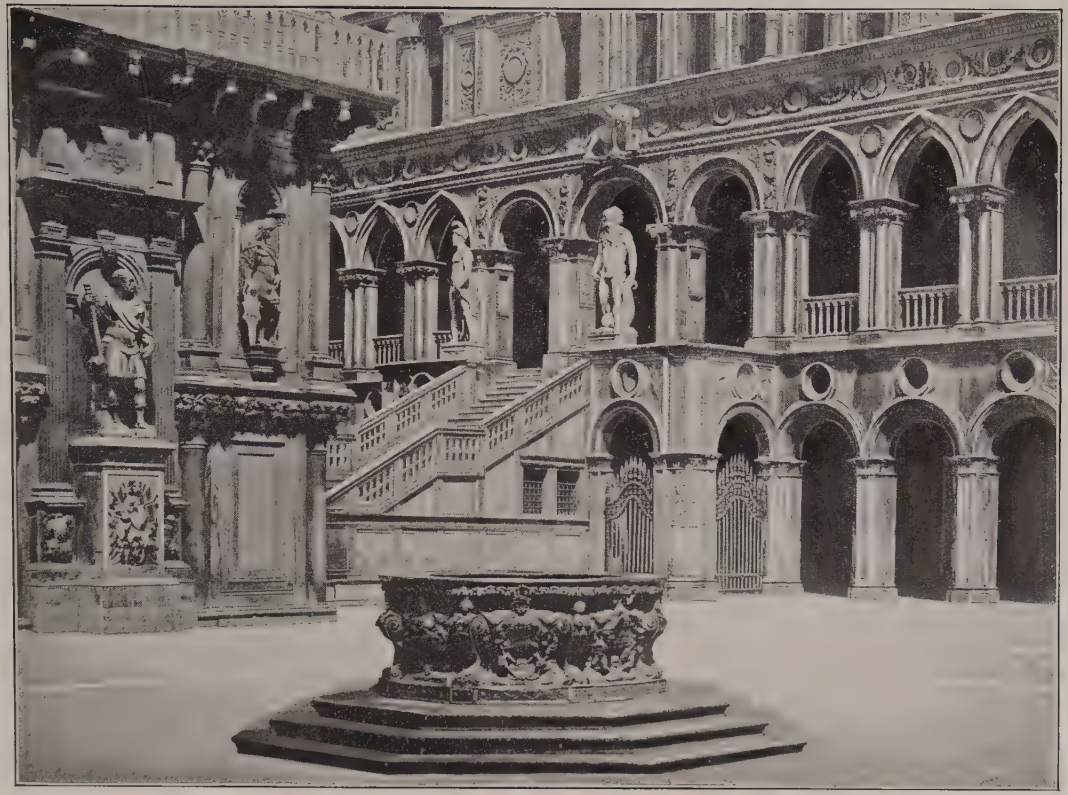


Fig. 23

Renaissance, when the variety that could be obtained through a close imitation of the classic system of design was nearly exhausted and originality was sought in the application of ornament in new and fantastic shapes. But even allowing that the design is not in the best taste, there can be no doubt that it was the residence of a wealthy nobleman, and taken as a whole, it is a singularly picturesque piece of architecture.

72. Palazzo del Consiglio.—The Palazzo del Consiglio, or council hall, at Verona, Fig. 5 (*b*), by Fra Giocondo, is a characteristic structure erected about 1500. It consists of an open arcade, over which are walls of plaster and stucco richly decorated in graffito work.

73. Church of St. Maria della Salute.—The church of St. Maria della Salute, Fig. 24, commenced by Longhena, in 1532, is beautifully situated on the Grand Canal. The plan of this edifice is octagonal, with chapels extending on each side. The central space is covered by a dome standing on a high drum, which is connected with the outer walls by buttresses that extend over the aisles and thus add to the richness of the exterior effect. A smaller dome covers the chancel, and a square tower with a domical roof adds variety and repose to the structure. The ornament is elaborate and presents many of the faults that characterize the latter part of the Renaissance style. Architects became tired of designing façades that consisted simply of architectural orders laid out with mathematical precision. In the endeavor to produce something new, the classic details were subjected to all sorts of indignities. Columns were designed with spiral twistings, capitals were composed with cupids and allegorical figures supporting the abacus. Large brackets or consoles from the cornice of the Corinthian order were introduced as buttresses, and smaller ones as keystones, and in the attempt to express original ideas with classic details, all care for the propriety of these details was overlooked. This was termed the Rococo period of the Renaissance and marked the decline in all countries where the style developed.

225 FIG. 24

ANALYTICAL STUDY

PLANS

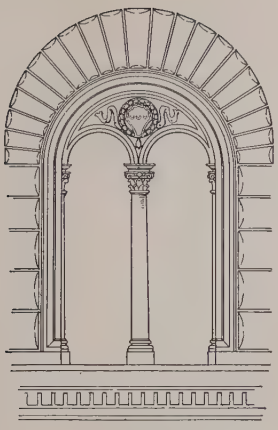
74. The plans (see Fig. 2) in the Florentine school were extremely simple, consisting of a number of apartments grouped around an interior court. Stairs were closed between walls and were usually vaulted over. In Rome, the plans were more varied and on a grander scale, and elliptical and circular stairways supported on columns are characteristic. In Venice, the canals required that the plans present a straight front. Stairways well in the central part usually opened on a court.

WALLS

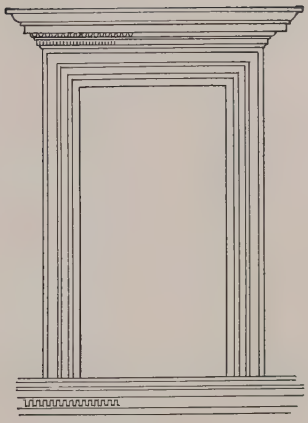
75. In Florence, rusticated walls with a dominant projecting cornice were characteristic. No exterior pilasters or columns were used, except as details of window treatment. In Rome, pilasters, two or more stories in height, supported a cornice that crowned the walls, and the window openings were treated as simple piercings through the wall curtain. Early in the style, however, the walls were left plain, with rustications at the angles and pilasters or columns in the first story only. In Venice, columns were used freely in each story, with an entablature for each, and little wall space was exposed. The general treatment approached the Roman imperial style as exemplified in the Colosseum.

ROOFS

76. Over galleries and passages semicircular vaults were used in Florence, and these were richly decorated. In church work, the dome was introduced over the crossing and the nave vault was coffered, as in the Pantheon at Rome. Tiles were used on the exterior and were sometimes visible, but usually the pitch was too flat for them to show. In Rome, coffered vaults were used for interior effect, but the exterior roofs were rarely visible. Domes



(a)



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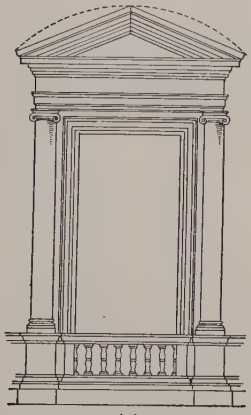

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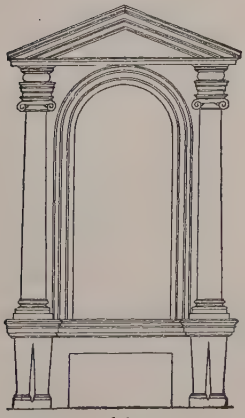

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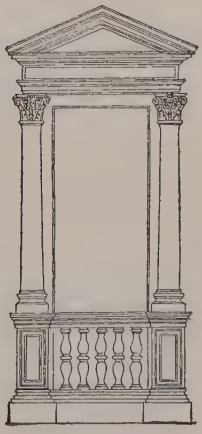


(f)

mounted on a high drum and crowned with a lantern became characteristic of all churches of the period. In Venice, a balustrade was carried above the upper cornice and the roof behind it was given only sufficient pitch to shed the rain.

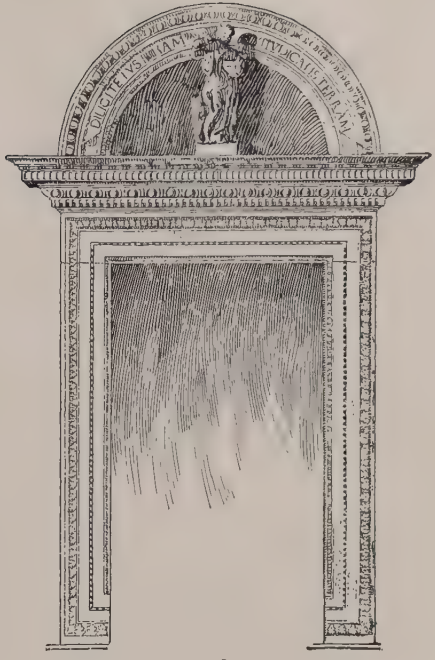
COLUMNS

77. In Florentine Renaissance, columns were used only for arcaded passages or for courts, and not as elements of wall treatment, as in the Vecchio Palace, Fig. 6. In Rome, pilasters were used on a gigantic scale across the front of the buildings, and all the details are designed in proportion to these pilasters as an order, and not in proportion to the scale of the building itself, as in St. John Lateran, Fig. 3. In Venice, columns were used in arcades, as in the Colosseum, and the entablature was broken out over them and then back along the wall space between, as in the Pesaro Palace, Fig. 5 (*a*).

OPENINGS

78. Windows in Florence were small and widely spaced. The early examples usually possessed semicircular heads and were divided by a columnar mullion carrying two minor semicircles with a complete circle between, as shown in Fig. 25 (*a*), which is from the Strozzi Palace, thus establishing a traceried head. Later, after the Roman school, the windows were straight-topped with a cornice as in (*b*) from the Gondi Palace or they were flanked by columns and surmounted with entablatures and pediments, as in (*c*), from the Pandolfini Palace. In Rome, the openings are either flanked by columns carrying a pediment or entablature for a window head, as in (*d*) and (*e*), from the Farnese Palace, or they are treated simply as wall piercings between the great pilasters that extend from basement to cornice. In Venice, the windows are tall, as in (*f*), and are set close together, the façade of a building being frequently treated as a series of voids and solids, through the adoption of the arcade and colonnade, similar to the Colosseum at Rome.

(*a*)



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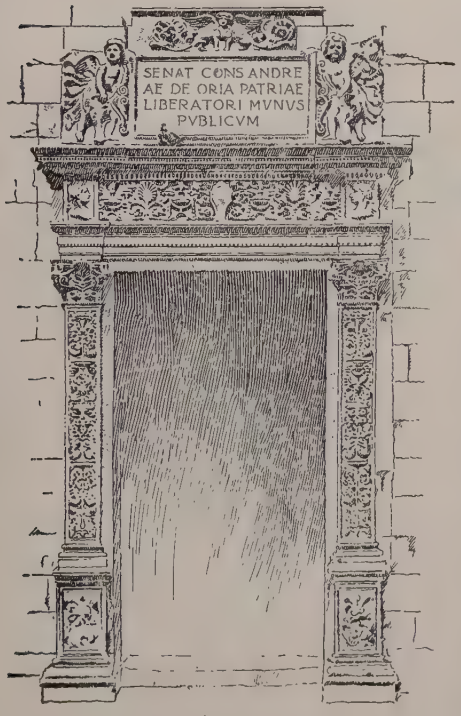

SENAT CONS ANDRE
AE DE ORIA PATRIAE
LIBERATORI MVNVS
PVBLICVM

(*c*)

(*d*)

FIG. 26

MOLDINGS

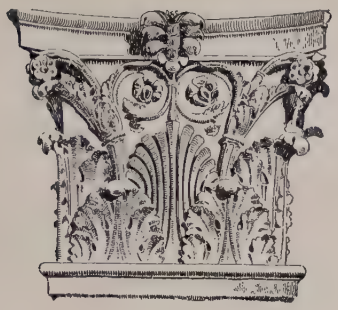
79. In Florence, the moldings are few and simple. In Rome, the details of the classic style were followed as closely as possible, but on a colossal scale. In Venice, the classic was followed, but the scale was smaller and the details were worked out with more delicacy.

ORNAMENT

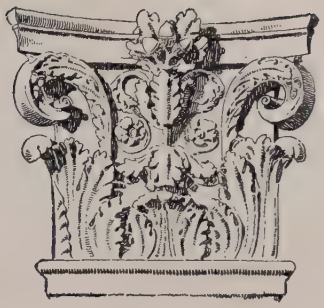
80. Fresco painting of the walls and ceilings was practiced in all three schools, as was also sculptured ornament in the friezes. The general decoration is usually grouped in masses in the Florentine style, to contrast with large areas of plain wall surface. On the exterior, about all the carved work observable are great armoried shields on the angles of the palaces, as in Fig. 1. In contrast to this, the Venetian style introduces decoration all over the front. Every spandrel has its appropriate sculpture in high relief and thus adds materially to the characteristic of the style.

81. On the interiors, the doorways were treated similarly to the window openings, and they were frequently carved with elaborate arabesques and classic ornament, as shown in Fig. 26. The example shown in (*a*) was executed in white marble, and consisted of two paneled pilasters for the side trim and an elaborate entablature for the lintel, or cap. The frieze was carved in the Greek honeysuckle and anthemion, and over the corona was turned a semicircular pediment. The example shown in (*b*) is similar, except that the side trim and lintel consist of moldings only, and the tympanum under the semicircular pediment is of black marble. In (*c*), which is an example from Genoa, a pedestal is introduced under the pilasters and the pediment is omitted, while at (*d*), also from Genoa, the capital is introduced below the door head—not a pleasing arrangement.

82. All pilaster caps shown in Fig. 27 are based on the Corinthian order, but none of them conform to it exactly.



(*a*)

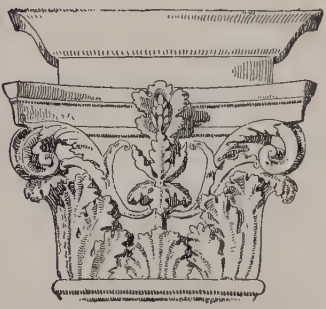


(*b*)

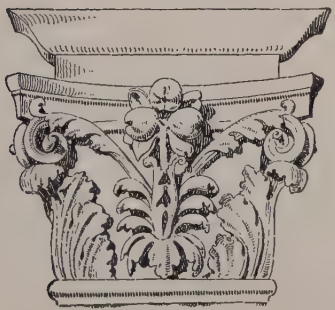
(*c*)

(*d*)

(*e*)



(*f*)



(*g*)

(*h*)

FIG. 27

The introduction of foliated heads and human figures is characteristic of the Renaissance and was later carried to extremes in France.

The arabesques that were carved in panels on the shafts of the pilasters, instead of the flutings of the classic models, were intricate and symmetrical, and were usually duplicated on opposite sides of a center line, as shown in Figs. 28 and 30. Fluted shafts were also used and the flutings were sometimes filled one-third the way up from the base with carved reeds or rope-like forms.

Bosses, as shown in Fig. 29 (*a*), (*b*), and (*c*), were introduced into ceiling decoration, and elaborate iron grilles, as shown in (*d*) and (*e*), were placed in the semicircular door heads.

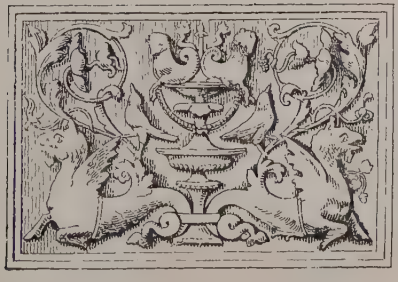
The use of color in the ornamentation of the Italian Renaissance was lavish and the designs were most elaborate and excellent in execution. It was an age when artists were the architects and the finest painters and sculptors of the day were employed on the decorations. The subjects adopted were allegorical or religious, and were treated with conventional symmetry, while the rendering, at times, was decidedly naturalistic. In Fig. 30 at (*a*) is shown a panel from one of the pilasters in the Vatican. It is symmetrically disposed on each side of a vertical center line and made up of subjects borrowed from mythological conceptions, combined in a conventional treatment similar to the Pompeian paintings. The central stem consists of an attenuated vase from which tendril-like scrolls branch, while impossible grotesque animals rear themselves on each side. These suggest ideas borrowed from the mythology of the Greeks, as do also the naturally rendered, and conventionally posed, cupids above. In mythology we have the centaur and the sphinx, each symbolic of the intellect of man and the strength of the beast; the griffin with the head and wings of a bird, and the body of a lion; the dragon with the head of a beast, the body of a reptile, and the wings of a bat; and numerous other combinations that establish a precedent for these forms in the Renaissance paintings.

(c)

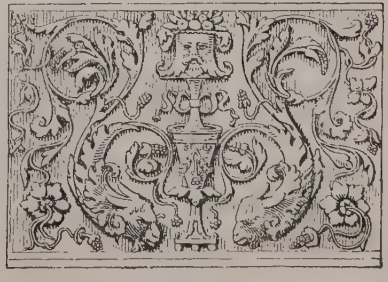
(a)

(b)

(d)



(e)

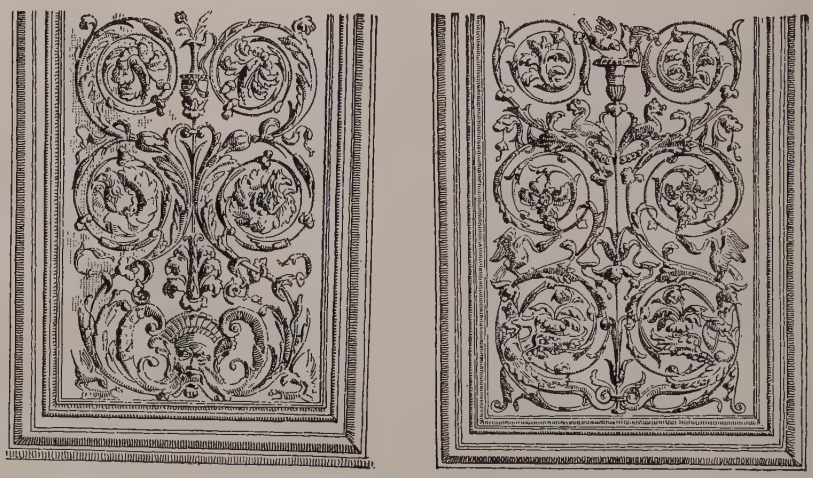


(f)

FIG. 28

(*a*) (*b*) (*c*)

(*d*) (*e*)



(*f*) (*g*)

(*h*) (*i*)

FIG. 29

(c)

(a)

FIG. 30

(*a*)

(*b*)

The forms are shaded to give "roundness" to the parts—a treatment antagonistic to the highest ideals of surface decoration—but this treatment is found in many Renaissance decorations and is characteristic of the style.

In Fig. 30 (*b*) is shown another panel where two male figures, naturalistically rendered, support a tablet and superimposed decorative forms. Analyzing the design one finds the male figures suggestive of Hercules or Atlas, the tablet appears to be modeled after a Roman altar, and the griffins, acanthus scrolls, and Greek vase all appear to be of Pompeian origin. An unlimited variety of design can thus be invented and when carried out in the varied possibilities of color scheme, the painted ornament of the Renaissance presents a unique and interesting study. Much of it is false, however; moldings, cornices, consoles, and brackets are painted on the walls instead of worked in relief and when viewed from the wrong point are entirely out of perspective.

REVIEW EXERCISES

1. What is the meaning of the term Renaissance?

2. Describe briefly the conditions and influences that led to the Renaissance movement.

3. What are the general characteristics of Renaissance architecture?

4. What are the contrasting characteristics of Renaissance and Gothic architecture?

5. (*a*) Into what three schools, or styles, of design is Italian Renaissance architecture divided? (*b*) What are the contrasting characteristics of each? (*c*) Name three important buildings in each style and state by whom they were designed.

6. (*a*) What was the Rococo period? (*b*) What was the character of its ornament?

7. Who was (*a*) Michelangelo? (*b*) Vignola?

8. (*a*) What is the Vatican? (*b*) When was it erected?

9. On a sheet of paper 9 in. × 12 in. make a drawing of an Italian Renaissance doorway (5 ft. wide and 10 ft. high) consisting of two pilasters supporting an entablature, the pilasters to be paneled and carved in Arabesque designs with characteristic capitals as illustrated. The drawings are to be similar to, but not copies of, Fig. 27 (*a*), (*b*), (*c*), and (*d*), and on a scale of 1 inch = 1 foot.

FRENCH RENAISSANCE
(1515 TO 1800)

INFLUENCES

83. Geographical.—France had by this time assumed the boundaries she was destined to maintain practically down to the present day. Under Louis XIV and Napoleon, she acquired more territory, but soon lost it, so it need not be taken into consideration. (See also influences under French Romanesque, *History of Architecture and Ornament*, Part 2.)

84. Geological and Climatic.—The geological and climatic influences are the same as those given under French Romanesque, *History of Architecture and Ornament*, Part 2.

85. Religious.—Although there was high feeling in France between the Catholics and the Reformers, the government was in the hands of the former and the Protestants had very little direct influence. Moreover, as sufficient churches had been built during the medieval period, there was little necessity for many others, and none of importance were erected until the 18th century. Thus the style had little influence on church architecture.

86. Political and Historical.—In 1494, Charles VIII of France invaded Italy; in 1508, Louis XII joined with Florence in an alliance against Venice; and from 1522 to 1542, Francis I was at war with Italy, and although the French were defeated in all these conflicts, they were brought into contact with the superior civilization of Italy and were drawn into the Renaissance movement.

When the kings, Charles, Louis, and Francis, returned from their campaigns in Italy, they brought with them Italian artists and workmen, among whom were Leonardo da Vinci, Vignola, and, later on, Bernini. Francis I was an ardent patron of the arts and literature and it is to him

that France owes her picturesque châteaux along the river Loire. He reigned from 1515 to 1547 and was succeeded by his son Henry II. Henry married Catharine de Medici, one of the great Medici family of Italy, and through this marriage and that of one of her later kings, France was under Italian influence for nearly 100 years. Henry was succeeded in 1559 by his son Francis II who died in 1560, and was followed by his brothers Charles IX (1560 to 1574) and Henry III (1574 to 1589), but Catharine dominated the policy of her sons. She was an ardent Catholic and persecuted the Huguenots unmercifully. Under Charles IX, in 1572, over 20,000 Huguenots were murdered throughout France on the eve of St. Bartholomew's day. This is known in history as the massacre of St. Bartholomew. Under Henry III, the influence of the Catholic party became so intolerable that the king in an endeavor to free himself from its power, had the Duke de Guise and the Cardinal de Lorraine, leaders of the party, murdered in his private apartments of the château de Blois, as a result of which Henry himself was treacherously murdered by a Catholic fanatic in 1589. Henry IV, a Protestant, then came to the throne and promulgated in 1598 the Edict of Nantes, by which the Huguenots were given freedom of worship without persecution. But Henry turned Catholic, married Marie de Medici, another descendent of the famous Italian family, and at his death troubles broke out anew. Louis XIII (1610 to 1643) was but a boy when he ascended the throne, and France was governed by Marie de Medici and the Prime Minister Richelieu, an Italian prelate. Under Louis XIV (1643 to 1715). France became the leading country of Europe and many grand building operations were undertaken.

87. Many fine public monuments were erected by the government; the palaces were enlarged; much pomp and display was introduced into all royal ceremonies, and everywhere was evidenced the pride and ambition of the nation. In 1685, the king revoked the Edict of Nantes, and the

freedom that had been enjoyed by the Huguenots for 87 years was withdrawn. Persecutions immediately began, and as a result thousands of the most industrious and intelligent of the citizens of France fled to England and other Protestant countries. Louis XV reigned from 1717 to 1774. He was a dissolute monarch, who wasted the public revenues in all sorts of extravagances that further disgusted the people. With Louis XVI (1774 to 1793), a reaction set in and under the influence of the simple taste of Queen Marie Antoinette, who realized that the impoverished condition of the country could not stand the wasteful extravagance that had characterized the previous reigns, and the architecture of the period reflects this influence. But the reaction came too late. The revolution broke out and the enraged populace endeavored to exterminate royalty by putting all the nobility to death. Louis XVI and Marie Antoinette were beheaded.

During the revolution no building operations were attempted, religion was abolished, and a reign of terror and mob violence ensued. Finally, in 1795, a new form of government was established called the "Directory," under which an army of 200,000 men was put into the field in command of General Napoleon, and the foreign powers that were in sympathy with the martyred king were defeated. But the Directory was not so successful in ruling at home. The royalists were constantly intriguing to regain power and the form of government became unpopular. Finally, in 1799, Napoleon overthrew the Directory and seized the reins of government himself—first as consul until 1804, and then as Emperor until 1815.

During this period architecture and decorations eliminated every detail that would remind the country of its late royal oppressors. Architects and designers searched classic history to find a style suitable to their new conditions. Roman details were abolished, but the simple lines of the Greek style and the delicate-colored arabesques of the Pompeian villas inspired the artists to new endeavors, and the Empire period of French architecture is characterized by these influences.

CHARACTERISTICS

88. French Renaissance architecture may be divided into three periods: the **Early Renaissance, or 16th Century** (1461 to 1589), comprising the reigns from Louis XI, to Henry III; the **Classic period, or 17th Century** (1589 to 1715), including the reigns from Henry IV, to Louis XIV; and the **Rococo period, or 18th Century** (1715 to 1793), under the reigns of Louis XV and Louis XVI.

The first period was transitional from the Gothic, but the second was marked by strong classical tendencies. The Rococo period was the decline, when ideas seem to have been exhausted, and meaningless detail, as in Italy, took the place of dignified and suitable ornament.

89. In Italy, the return to classic forms was almost immediate. The principal buildings were the palaces erected in the large cities, for the nobility, wealthy families, and the popes. In France, the principal structures were the châteaux erected as country residences for the king and his court.

The narrow streets of Florence, the straight waterways of Venice, and the public squares of Rome, necessitated a severely classical disposition, while the open-country surroundings, where the châteaux were erected, demanded the more picturesque treatment that could be attained through the Gothic school. The proximity of Rome rendered the details of Italian Renaissance almost servile in their classic purity, while in France, the detail was used freely and was altered whenever necessary to suit the Gothic construction.

The palaces of Italy usually presented only one front, while the châteaux of France were to be seen from four sides, and thus demanded a picturesque grouping from every point of view. The Italian villas are symmetrical, classic designs, according to the rules of the orders; the French châteaux, irregular Gothic castles with a veneer of Renaissance.

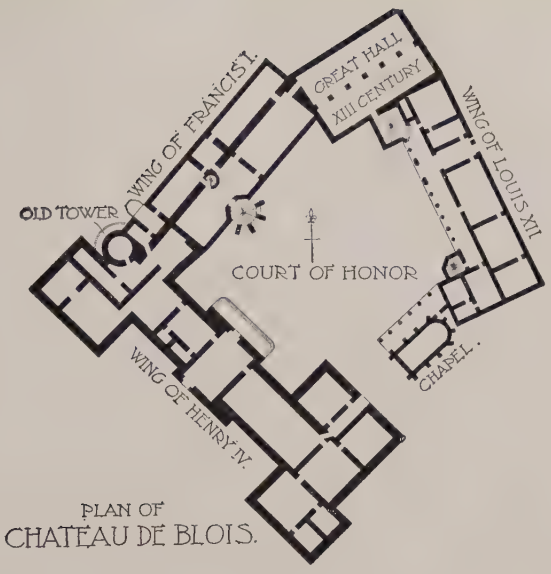
EXAMPLES

90. Châteaux.—The most interesting monuments of the Early French Renaissance are the *châteaux*. These constituted the country residences of the kings and their royal relatives. The châteaux are somewhat similar in character to the villas of Italy, but were situated farther away from the cities and were used more as rural retreats than were the Italian villas. A characteristic that distinguishes the French from the Italian Renaissance is that the earliest royal residences were in the form of a feudal castle; and when the invention of gunpowder rendered the castellar system of defense ineffectual, these residences began to assume a less forbidding and a more hospitable appearance.

Large mullioned windows flanked by classic pilasters pierced the outer walls, while conical and high-peaked roofs covered the towers and main buildings. Richly ornamented dormer-windows and pilastered chimneys broke the roof slopes, while the buttresses and vaulting of the Gothic system were still retained. Thus, the honest, straightforward system of castellar construction is found emerging from its crudeness and bedecking itself with the refinements and frivolities of the approaching Renaissance. Along the river Loire are a number of these châteaux, many of which were erected or altered during the reign of Louis XII, while others were remodeled by his successor, Francis I. The châteaux along the valley of the Loire therefore present most excellent monuments from which to study the French Renaissance throughout its entire development.

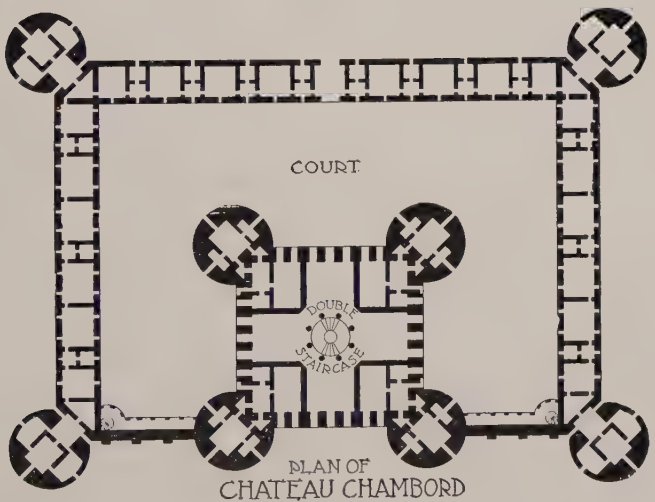
91. Château de Blois.—The largest, and in some respects the most important, of these country residences of royalty is the château at Blois, a plan of which is shown in Fig. 31. In this structure, as it exists at the present day, are brought together the expressions characteristic of each successive period of the French Renaissance.

The plan of the château consists of three wings so disposed as to enclose a court of honor in the form of a



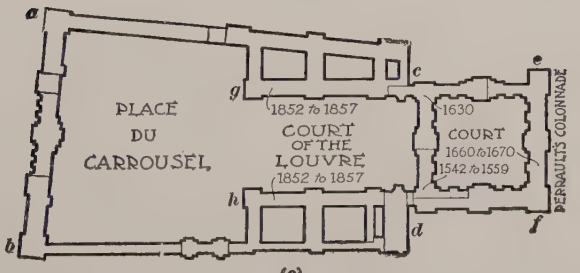
PLAN OF
CHATEAU DE BLOIS.

(a)



PLAN OF
CHATEAU CHAMBORD

(b)



(c)

FIG. 31

distorted quadrangle, this irregularity being a most conspicuous and characteristic bequest that was left to the new structure by the old medieval castle on whose lines the present edifice is erected. The northeast side was built by Louis XII toward the end of the 15th century; the northwest side was completed by Francis I in the middle of the 16th century; and the southwest side is the work of Gaston of Orleans in the beginning of the 17th century.

92. Having discussed the characteristics of the wing of Louis XII in *History of Architecture and Ornament*, Part 3, the wing of Francis I, on the northwest side of the court, Fig. 32, will be considered. This part was erected only 50 years after the wing of Louis XII was completed, but the difference in style is manifest even to the most casual observer. The artists of the 16th century, hurried along by the swift current of those 50 years of wonderful intellectual regeneration, seemed to understand even better than their successors that the Romans had not used the orders as elements of construction, as the Greeks did, but as decorative details having no essential relation to the construction whatever. They seemed to know by instinct that there was no law, moral or artistic, that should prevent them from taking those Roman orders and details and using them in any way they chose, structural or nonstructural, so long as their use suited the purpose to which they were applied. Thus, a study of this period of architecture shows that the French builders accepted not the conventional restrictions of the classic formulas, but their essential spirit as an organized scheme of ornament.

93. The wing of Francis I, as it faces on the court, shows that the lessons in classic architecture given by the great Italian masters, who were entertained at the court like princes, were accepted by the French architects with interest and respect for their historic value, but were not learned by rote nor considered as laws on which all architectural designs must be rigidly carried out.

On the ground floor, the windows of this wing are not arranged to coincide with those of the floor above, thus

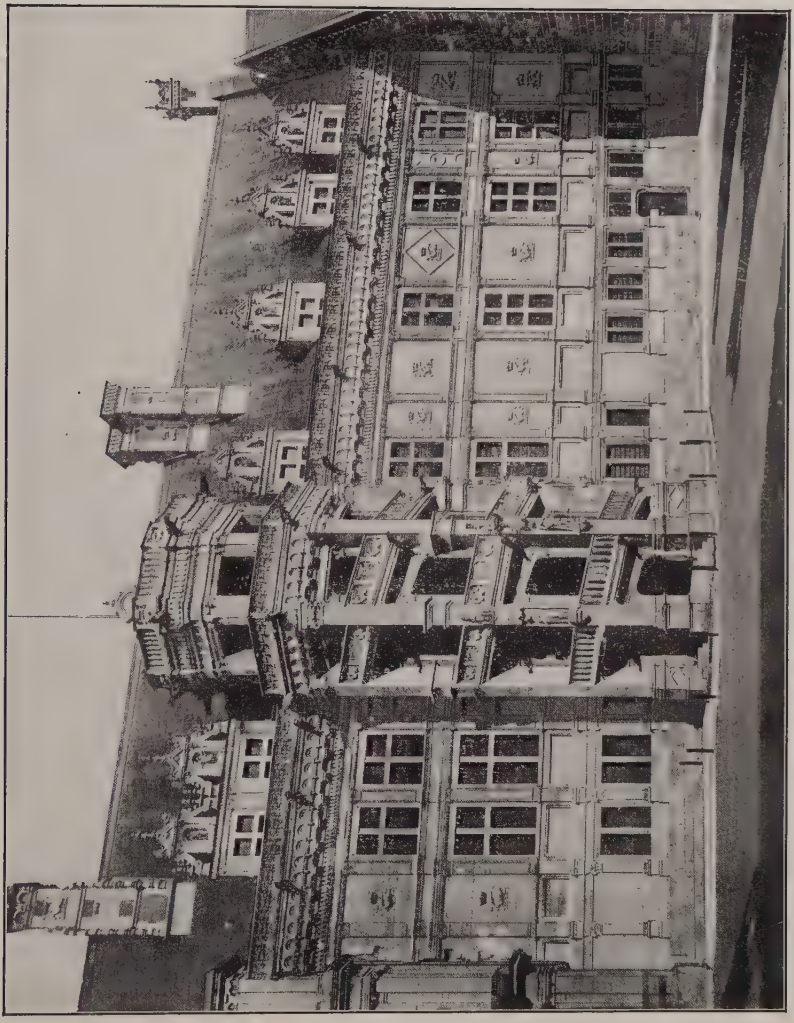


FIG. 32

introducing at once that old feeling of Gothic contempt for absolute symmetry. The pilasters on each side of the basement windows support a string-course that establishes a line of demarcation between the basement order and the more important series of pilasters in the two upper stories. All the pilasters are irregularly spaced so as to have suitable relations with the windows, as the builders understood that the details as used by the Romans were decorative in their character and not structural.

Between the two principal stories there is a broad string-course, or entablature, that divides the pilasters into two orders, one superimposed over the other. A great cornice surmounted by an elaborate balustrade crowns the entire wall. The coarse corbels that supported the Gothic parapet are replaced by elegant modillions borrowed from the Corinthian order, and between them are carved a series of delicate shells in place of the machicolations through which feudal ancestors poured deadly missiles and boiling oil on the unwelcome visitors below. The balustrade above the cornice is a most intricate design, in which the letters F and C are interwoven as initials of Francis and Claude, the king and queen.

94. The great octagonal staircase on this façade is a unique detail in architectural design and a masterpiece of 16th century architecture. It shows clearly the audacious independence of the French architects of the period, for it is entirely independent of the wall surface from which it protrudes, is unsymmetrically placed in the length of the wall, and consists of four great free-standing, Gothic-like buttresses that are crowned with capitals of a composite character. These buttresses, whose axial lines radiate from a common central point, support the continuation of the cornice from the main wall, and this continuation of cornice is the only detail that ties the stair tower to the main building.

In the lower part of each buttress is sunk a niche that is beautifully molded and canopied in the most elaborate traceries of Gothic imagination, but executed in the terms

FIG. 33

of the dawning Renaissance. Horizontal moldings divide the buttresses at the floor levels, but with these the horizontal elements cease. Every other detail inclines with the stairs as they ascend, and richly carved balconies extend from pier to pier. The balustrades of the balconies are divided into panels and contain the crowned F or the crowned salamander, emblematic of Francis I.

Comparing this wing with that of Louis XII, it is difficult to realize that a period of only 50 years could effect this change in style. The new work is fresh, cohesive, and architecturally grammatical, and seems to possess none of the weaknesses resulting from timidity in the use of a new style.

95. The exterior façade of the wing, as shown in Fig. 33, is merely a facing on the structure of the 15th century, as the whole composition grew out of the necessity of establishing communication between the tower of Moulin and the buildings on the southwest end of the court. A series of arches in two stories, separated by piers and engaged columns, were carried around the tower, and the circular shafts were carried to the cornice, after the Romanesque manner. At a later period, these orders were carried for six bays toward the north, with elliptical arches instead of semicircular ones, and with pilasters to separate them instead of columns. Still later, six more bays were added, and thus the entire façade was completed.

The roof is supported on free-standing columns, poised above the pilasters like an Italian loggia, or balcony, connecting the top-story apartments. A two-story dormer breaks the continuity of this roof arcade with Gothic independence of symmetry, being just out of center. In fact, the great charm of this entire façade lies in the disregard of the absolute symmetry and duplication that was being followed in Italy and later was to characterize the French style also.

96. Château Chenonceau.—The little château of Chenonceau, Fig. 34, is of about the same date as the wing of Francis I at Blois. It was commenced about 1515 on

FIG. 34

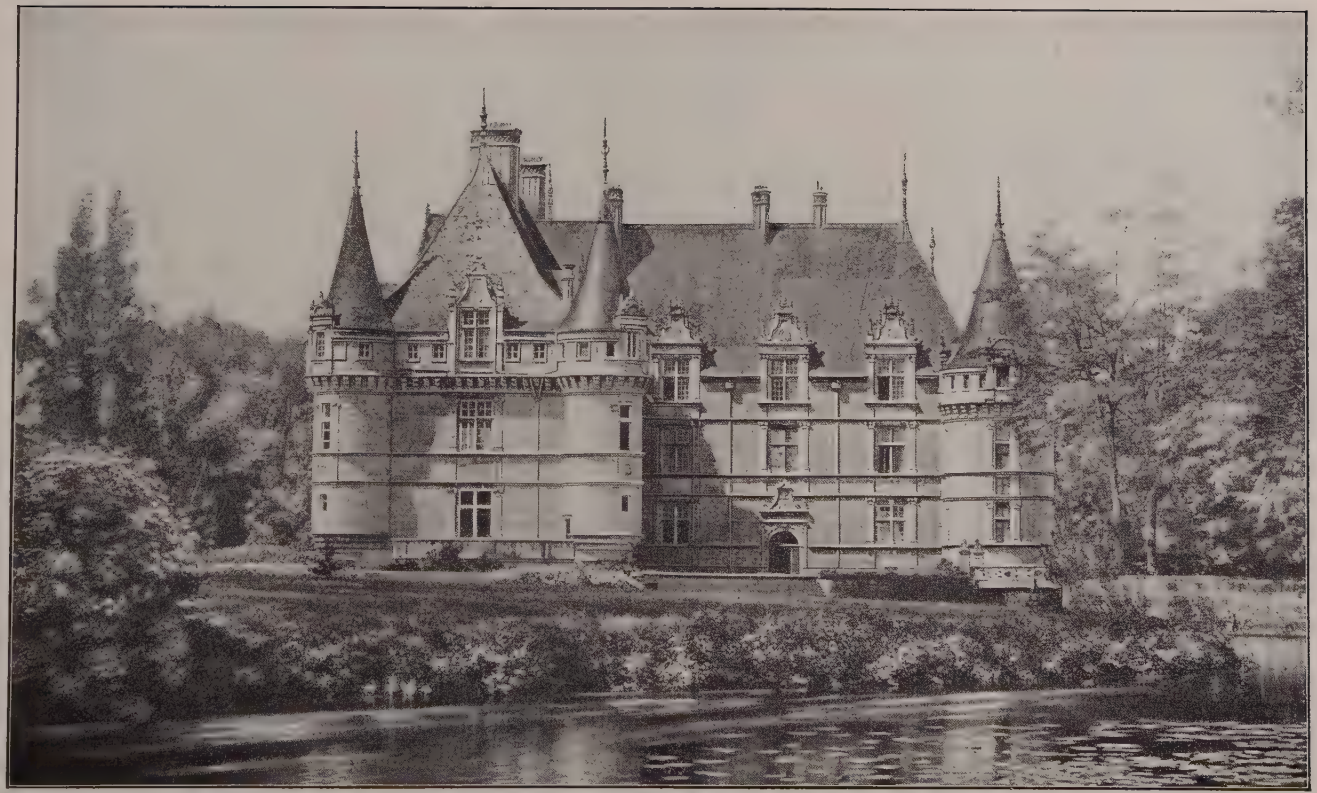


Fig. 35

the site of an old mill, after designs made by Pierre Nepveu. The mill foundations being in the river, the château extends partly over the water, and its base lines were necessarily somewhat sharp and angular. The château itself, however, broke out from these foundations in true Gothic fashion into round towers at the angles, which were roofed over with conical turrets having steep hip roofs between. On the entrance façade, the roof line was broken by three dormers similar to those on the Francis I wing at Blois, and although these are arranged symmetrically over the windows in the façade below, and the details of the front are symmetrically disposed about the center, the whole composition is more Gothic in feeling than Renaissance.

97. Château Azay-le-Rideau.—The château of Azay-le-Rideau, Fig. 35, was begun in 1520, five years later than Chenonceau and a few years before the completion of the Francis I wing at Blois. It presents no single feature that can compare with the octagonal staircase at Blois, nor is its situation so romantic as Chenonceau, but in refinement of detail, harmony of arrangement, and simplicity of outline, it is equal to any of the châteaux of Touraine. The plan is L-shaped, each angle of which is enclosed by a tower crowned with the characteristic conical roof. The towers are battlemented, as is also the curtain wall between them in some places, and even the loopholes between the embrasures proclaim the feudal origin of many of the details of the French Renaissance. Azay-le-Rideau, therefore, is essentially Gothic in its general conception, but the wide, carved window openings flanked with pilasters, the fanciful pediments crowning them, and the horizontal bands subdividing the façade, all point to classic influences and incipient Renaissance. The richest ornamentation is to be found on the dormers, which resemble those at Blois.

98. Château Chambord.—The château of Chambord, Fig. 36, was erected by Francis I, with the intention of making it the most magnificent in France. The location is unromantic at the present time, as the timber has all been

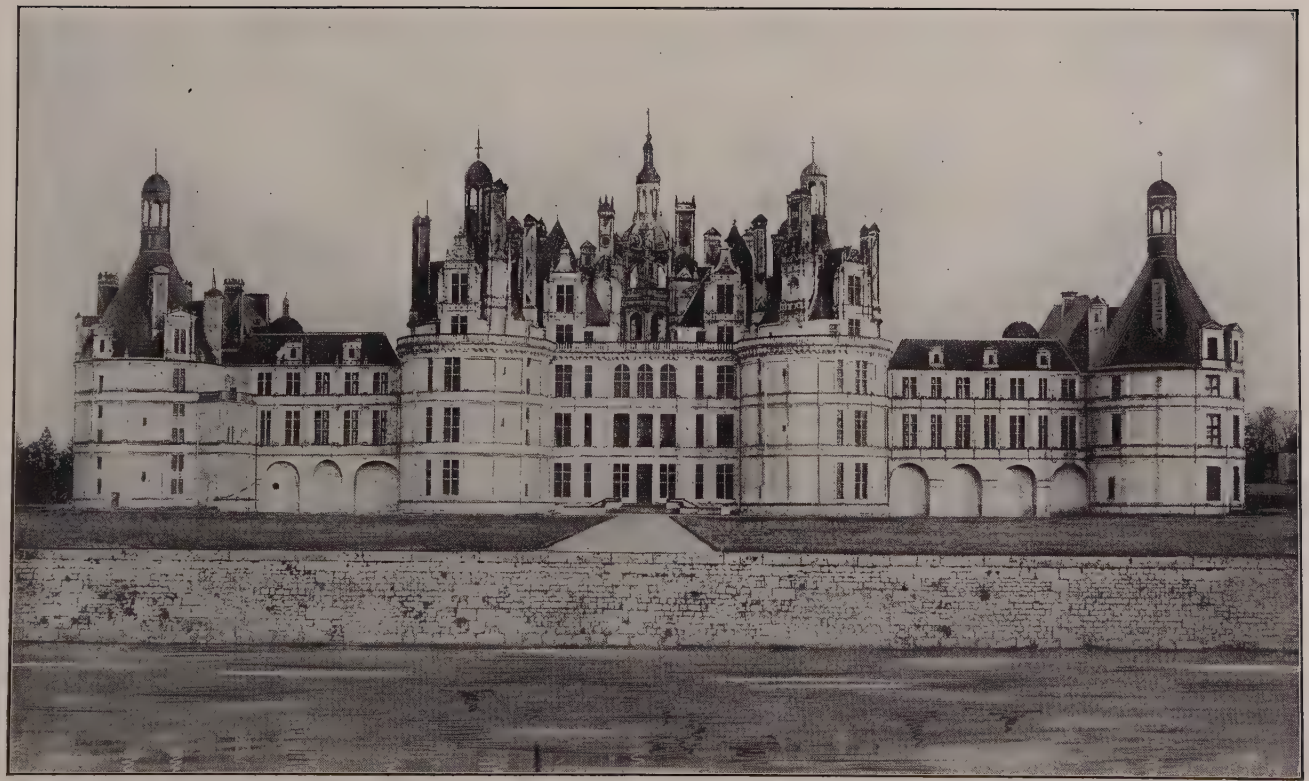
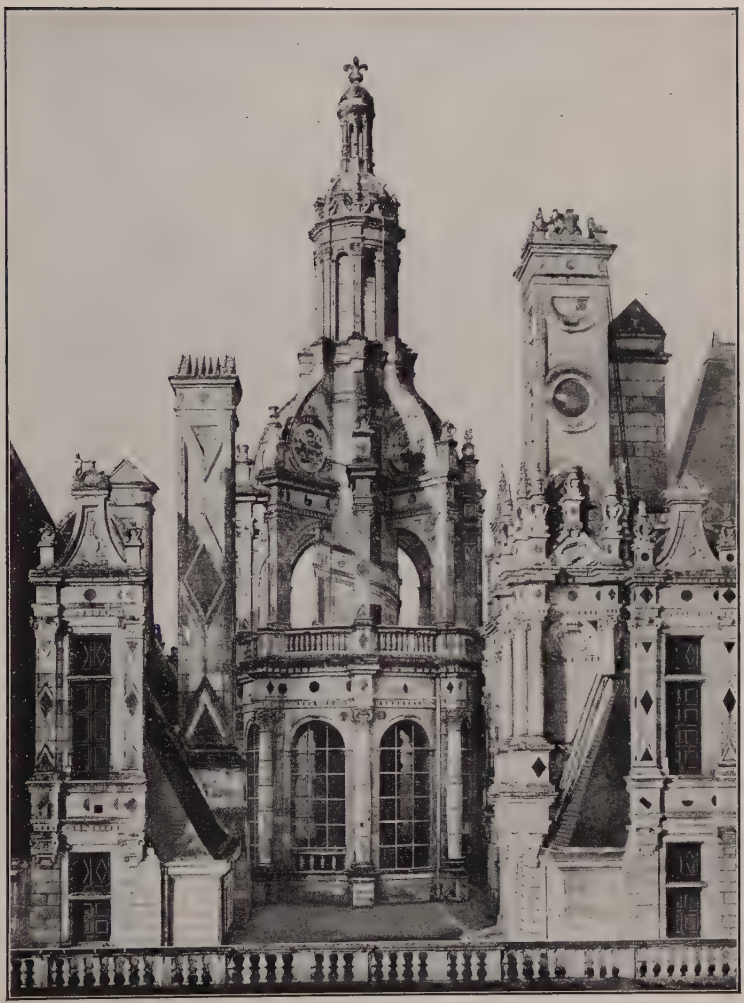


Fig. 36



251 FIG. 37

cut and the château left alone on a flat, sandy plain. Being at a considerable distance from any supply of building material, this château was a very expensive palace to build. However, time and expense were nothing to a monarch of the temperament of Francis I. The suite of Francis I consisted of about 1,800 people, and as it was the whim of the monarch to wander constantly from château to château, the housing of this tremendous retinue was a problem of no small consideration. Chambord was therefore built for their accommodation, as they could not obtain comfort elsewhere.

Chambord had 440 rooms, and enough stables to accommodate over a thousand horses [see plan, Fig. 31 (*b*)]. Originally, it was situated in the center of a wooded park, the enclosing wall of which was 21 miles in circumference. The plan of the château was a rectangle, with a tower at each corner; the donjon in the center of the main façade is a relic of feudal planning.

The angles of the plan are enclosed by immense round towers and the main façade is broken by two others, so as to include the outer corners of the donjon. The walls are divided into panels by horizontal string-courses and pilasters, which, with the window openings and other details, are arranged with rigid symmetry and regularity. Were it not for the round towers, which are of enormous girth, the walls would pass for commonplace Renaissance, but the roof that crowns the whole structure is of most riotous Gothic, carried out in Renaissance detail. It scarcely seems credible that this was the design of the same architect that created the dainty little château of Chenonceau. This roof fairly bristles with a forest of towers, turrets, dormers, and chimneys, all of which are carried out in rather coarse Renaissance detail, as shown in Fig. 37.

99. In the center of the donjon was a double staircase as celebrated for its ingenuity as that at Blois was for its beauty. This staircase consisted of two spiral flights, one coiled within the other, so that persons going up and down stairs would not meet in passing. On the second floor, this

stairway opened at the intersection of two wide corridors, as shown in Fig. 38, and continued its windings up to a lantern above the roof, as shown in Fig. 37, where it ended on a balcony. As shown in Fig. 38, one of the spiral stairways starts from the landing shown, and winds to the left in a continuous flight, while the second stairway starts at the landing on the opposite side of the shaft and winds spirally beneath the first. In the illustration, the two balustrades

Fig. 38

that show one over the other flank the two independent stairways. The interior double stairway terminates in the lantern shown in the center, Fig. 37, from which access is obtained to the immense roof, which is surrounded by a balustrade.

All the carved details are interwoven with the crowned F or crowned salamander of Francis, and occasionally with the crowned H of Henry II, his son, who inherited the château after Francis I died and left it unfinished, notwithstanding the fact that 1,800 men had worked on it for 12 years.

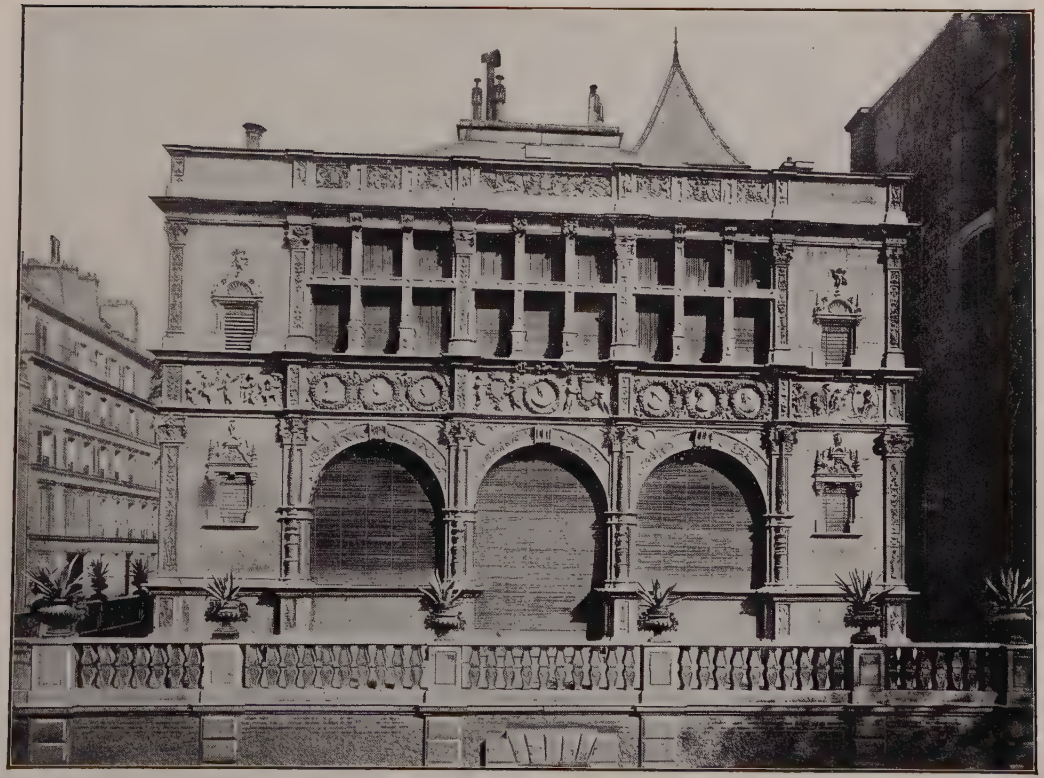


FIG. 39

255 FIG. 40

100. Hunting Lodge of Francis I.—The hunting lodge of Francis I, Fig. 39, was built in 1527 at Moret, in the forest of Fontainebleau, about 35 miles from Paris. It is characteristic of this period of the Renaissance and shows more than do the châteaux of Touraine the strong influence of the Italian style. The treatment of the façade, with the solid ends and the windows grouped in the center, is distinctly Venetian. The ornament is rich and beautifully executed and shows scenes from the chase and portrait medallions of members of the royal family.

101. Church of St. Etienne du Mont.—St. Etienne du Mont, Fig. 40, was one of the few churches built during the reign of Francis I. Ecclesiastical architecture received scant attention during this period, but the edifices of this kind that were erected adhered far more closely to Gothic details than did the secular buildings. In Fig. 40, the main portal, with its four columns and pediment with superimposed attic treatment, is essentially classic, but the rose window in the center, the pointed gable above, the traceries in the openings, the flying buttresses at the side, and the irregularities of the sky line, are Gothic in the extreme.

102. Louvre Palace.—The most important work of the Francis I period was the rebuilding of the Louvre, in Paris. The old Gothic fortified palace had always been the principal residence of the kings, but it had become so unsuited to the requirements of the age that it was torn down in 1546 and entirely rebuilt in the new style from plans prepared by two architects—Serlio, an Italian, and Pierre Lescot, a Frenchman. The Louvre consists of a quadrangular court 394 feet square surrounded on four sides by galleries, Fig. 31 (*c*), two of which extend westward until they meet the Palais Tuileries *a b*. The east wing, or gallery *e f*, of the Louvre is 548 feet long and 90 feet high, and contains the celebrated colonnade, subsequently designed by Perrault. The south side *b d f* faces the river Seine, and is 2,250 feet long. In the middle of each façade facing the quadrangular court, there is a pavilion rising above an archway, over each of

Fig. 41

which are constructed niches that were afterwards embellished with statues. The height is divided into three stories, the divisions of which are emphasized by pilasters in the Corinthian and Composite orders. The orders, however, were not used in great prominence, but the ornament and sculpture were appropriate and refined.

103. Classic Period.—The Classic Renaissance included the period immediately following the reign of Francis I up to the end of the 16th century. The charming independence of the Francis I style began to give way about the middle of the 16th century to a more servile copying of antique details. Façades became flat, and cornices were more conspicuous. Arches were introduced after the Roman style, and the carving became heavier and more aggressive instead of delicate and fanciful, as were the arabesque designs of the earlier period.

104. In the southwest wing of the château at Blois, Fig. 41, which was designed by François Mansard for Gaston of Orleans, a brother of Henry IV, the tendency to copy the classic orders literally, and to decorate every opening and angle with some form of classic ornament, regardless of the convenience of plan or the propriety of the detail, is clearly shown. As the architects became more learned, they lost their fearlessness and independence, and instead of simply borrowing ideas from classic models, they appropriated the whole system.

The Roman orders of architecture, according to Vignola, were loyally reproduced by Mansard in the southwest wing at Blois, presenting a contrast to the wing of Francis I that is full of historic meaning. Mansard constructed the first story in the Doric order, the second story in the Ionic order, and the third story in the Corinthian order, precisely as the works of Vignola dictated. The window heads, pediments, and arch imposts were all intended to be strictly Roman, and a suggestion that any part of the composition was of French origin would have been considered an insult to the designer. The roof, however, was an invention of the

259 FIG. 42

architect; existing through necessity, it was designed to slope back, as if hiding behind the aristocratic classic detail. No high roofs existed in the ancient monuments, and it was impossible for the architects of the 17th century to introduce to prominence any detail, no matter how necessary, that had not its origin in classic Rome.

105. Sorbonne Church.—The Sorbonne Church, Fig. 42, was one of the most interesting designs of the classic period. The exterior is a simple composition, being treated with superimposed orders under a low pediment in the center. A high dome covers the center of the plan, around which are grouped heavy, square pilasters that serve as buttresses. In this period and the successive ones, the dome is more and more frequently used as an important detail, even sometimes to the subordination of the other parts.

106. Age of Louis XIV.—The age of Louis XIV was remarkable for its literary and artistic activity. The architecture was conspicuous by its liberal use of the orders in exterior design, while the interior decoration was showy and capricious, usually to excess. Papier mâché and stucco were freely used in some examples of relief ornamentation far better suited to the decoration of a boudoir than that of a ballroom or a hall of assembly.

107. In 1688, the east wing of the Louvre was completed from the designs of Claude Perrault, the court physician, whose plans were accepted in preference to those of Bernini. The colonnade of the Louvre forms one of the most imposing façades in existence, but it is a mere decoration, and possesses no structural relation to the building it forms a part of. It is dignified and stately and well suited to its position on the façade of the finest palace in France, but its existence is structurally unnecessary. (See Fig. 43.)

108. To this period is also due the Hôtel des Invalides, or veterans' asylum, Fig. 44, by Jules H. Mansard, a son of François Mansard. Here the classic orders may be seen in superposed series with Palladian regularity, while the whole is crowned with a dome, which is a masterpiece of the age.

FIG. 43

FIG. 44

263 FIG. 45

109. Age of Louis XV.—Under Louis XV, the Rococo was introduced into France through the effort to inject some originality into the old, stereotyped classic designs. External decoration tended to the greatest extravagance in design and an utter disregard for constructive propriety. Scrolls, shells, palm leaves, and distorted forms were carved on the cornices and friezes almost to the exclusion of straight lines.

110. The **Church of St. Sulpice** was built in 1755. The interior of this structure, Fig. 46, dates from the 17th century, and though well designed, is in no way a remarkable composition. The façade, however, designed by Servandoni, is one of the most striking architectural compositions in Paris. It consists of a classic composition in two stories, with a well-proportioned Doric order below and a superposed Ionic order supporting the main corners. Two tall lateral turrets flank the angles and render the design symmetrical and well balanced.

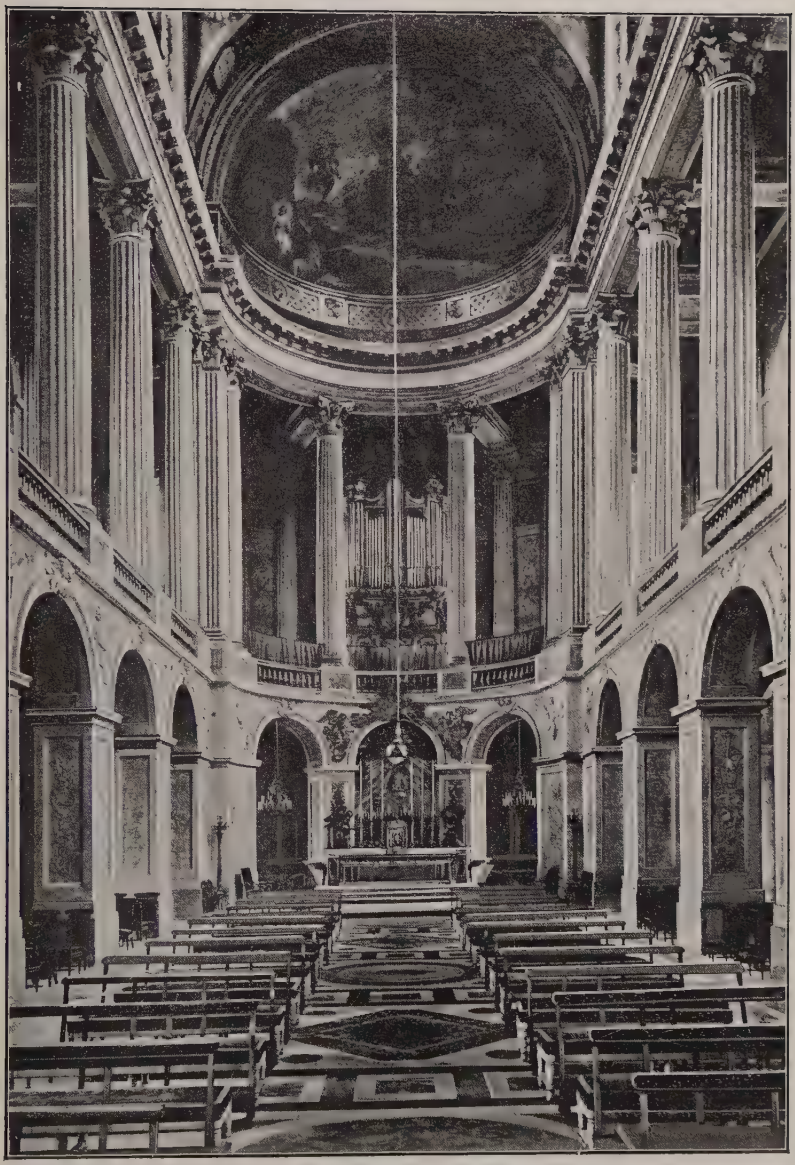
111. Versailles Palace.—The palace at Versailles is an immense edifice that was built by Louis XIII in the latter half of the 17th century. Its erection almost exhausted the resources of the national treasury, and considering the great expenditure the result is far from satisfactory. There is no dominant feature in the composition; neither is there an imposing entrance. The plan lacks the ingenuity usually displayed by the French architects. It consists of a central court and two great wings, one extending to the north and the other to the south. A portion of the northern wing is shown in Fig. 47, from which can be seen the lack of harmony in the details. The tetrastyle portico over the rustic basement is the pavilion of Louis XIV, while the structure to the right of it is the chapel, the interior of which is shown in Fig. 48.

112. Petit Trianon.—The Petit Trianon, Fig. 49, erected by Louis XV, in 1766, shows clearly the tendency to adopt fully the Italian Renaissance detail. The treatment here is essentially after the Roman school and shows no influence of the French traditions.

265

FIG. 46

Fig. 47



267 FIG. 48

FIG. 49

ANALYTICAL STUDY

PLANS

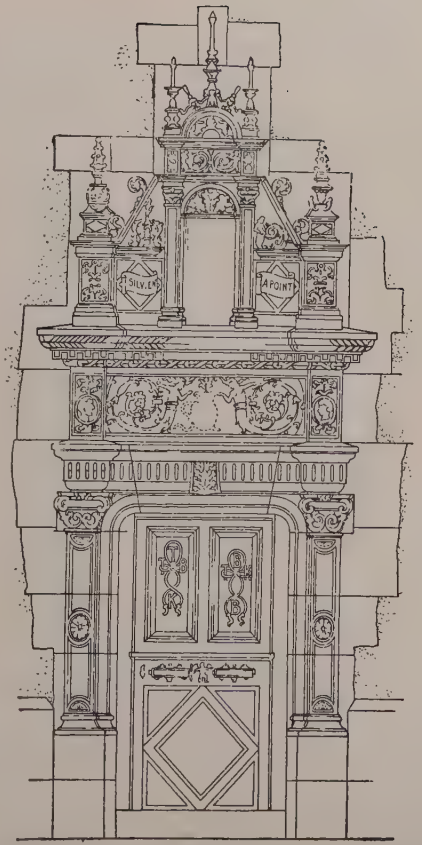
113. The Gothic castle plans materially influenced the early châteaux, many of which were built on the sites of old medieval structures. A few large residence structures, however, were erected on entirely new sites, and Chambord may be taken as an example of one of them. Chambord was an early attempt at an ideal palace plan. The town houses retained the interior court of the medieval castle, and closed it on the street side with a screen wall. The windows of the principal ground-floor apartments opened on the court and not on the street. In Italy, the central courtyard was the principal feature of the palaces. It was usually surrounded by a covered colonnade or an arcade over which the second floor projected.

WALLS

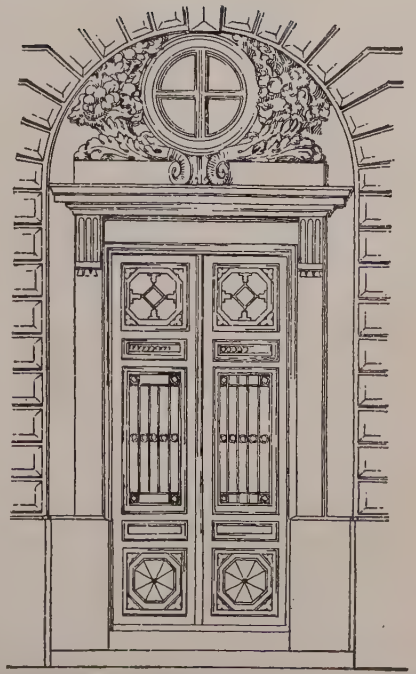
114. At first, the walls retained the Gothic gables and stone dormers, but later they gave way to the classic pediment and balustrade. The mansard roof was used over pavilions at the angles. Stone was used chiefly, though in some localities brick was combined with it. The architectural orders were sparingly used at first, but later gave way to strong classic treatment. This contrasted with the Italian style, which from the beginning made extensive use of the orders on the plain, straight façades, with their heavy projecting cornices.

ROOFS

115. The high, pitched roof of the Gothic style remained to characterize the French Renaissance, while flat, low roofs characterized the Italian style, where, owing to narrow streets, the roof could not be seen. Chimney stacks were



(a)



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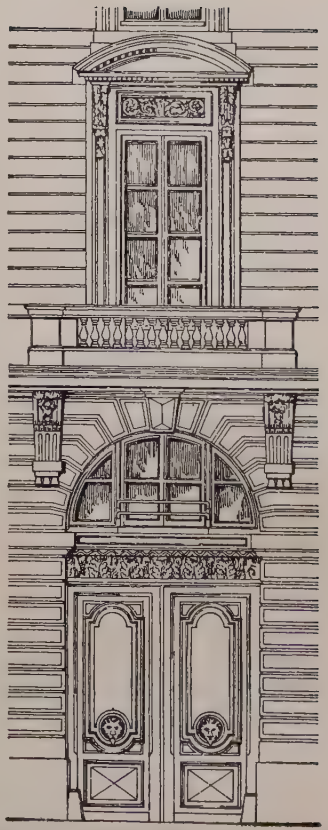


(c)

hidden in most Italian examples, but at Venice and in early examples at Florence, tile roofs were made visible above the cornice, while in France the fanciful treatment of the chimneys was characteristic of the style.

COLUMNS

116. In the early work, pilasters were mere decorative adjuncts to Gothic construction, but later they were paneled and carved with geometrical and foliated ornament; whereas, in Italy, geometrical decoration of the pilasters was unusual, the pilaster there being used for its architectural value as an order, rather than for its decorative effect. In France, an order of pilasters was used to support the window head in the first story, and the pedestal of the superimposed order formed the sill-course in the story above, thus showing the influence of Vignola; whereas, the Italian style carried an order through two stories, after the system of Palladio.

OPENINGS

117. The mullions and transoms of the Gothic style remained in the Early Renaissance (see Fig. 33), but later, as the orders were used successively in each story, the horizontal lines of their entablatures were used to mark the sill-courses and lintel courses of the windows (see Fig. 42). Symmetry, both in size and in arrangement, was aimed at until toward the end of the period, when there was little original feeling left in the designs. In Fig. 50 are shown three characteristic doorways. At (*a*) is an example from Chenonceau wherein the classic details are used decoratively, while the Louis XIV door at (*c*) and the Louis XVI door at (*b*) show the severe treatment imposed by close adherence to the Italian style. In the Italian Renaissance, symmetry regulated the openings from the beginning, and in the late examples the position of these openings was determined more by the rules of the classic orders than by convenience of interior arrangement.

The attic was rare in the Italian style, but a special feature in the French. The heavy cornice, with windows in the frieze, topped the Italian wall, while a balustrade surmounted the French wall, and dormer-windows appear above it in the roof slope.

MOLDINGS

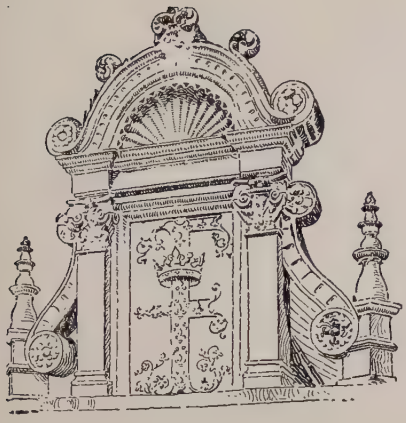
118. The Early French moldings were a combination of classic and Gothic, but the Gothic details gradually gave way to the full classic profiles. The Italian moldings were full and of great projection, especially in the great overhanging cornices. The string-courses in the early work were of less projection, in order to preserve the dominance of the cornice. Where orders were used in the stories, the moldings were purely classic and were studied with great care.

ORNAMENT

119. In France, where the Gothic period had left many fine examples of carved-wood panels, wood remained in use for decorative work and was richly carved with arabesque designs. In Italy, however, modeled plaster and frescos were used for decorative effect. Later, Raffael used a combination of the two, and this style pervaded the later ornament of the French Renaissance, when more Italian artists were imported to work on the palaces of Versailles and Fontainebleau.

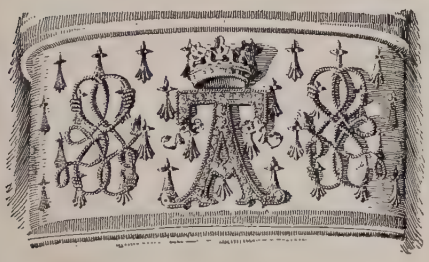
During the reign of Louis XIV, the characteristic tapestry hangings as a wall decoration were superseded by panels of papier mâché and stucco decoration in white and gold. Every detail was ornamented with it, and during the period of Louis XV the rococo details assumed an elaborate and meaningless character that destroyed entirely the decorative value of the ornament.

120. Characteristic ornamental details in the Early French Renaissance were the initials and symbolic devices of the kings interwoven with other ornament in the carved

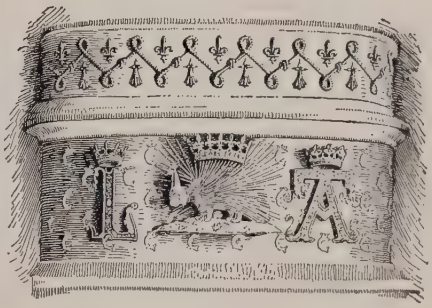


(*a*)

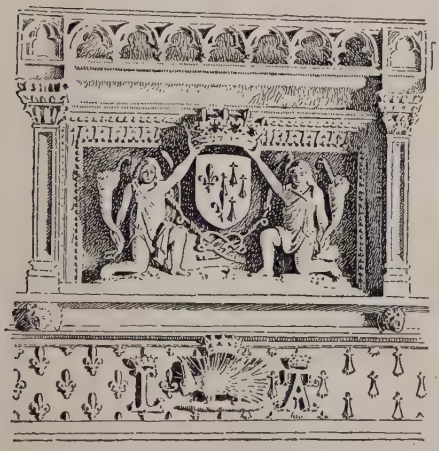
(*b*)



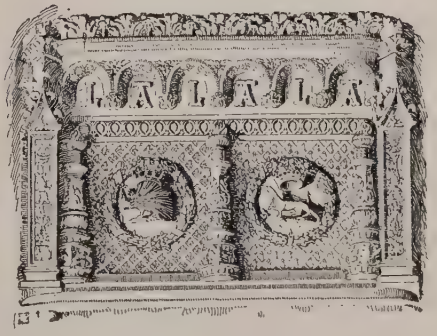
(*c*)



(*d*)



(*e*)



(*f*)

FIG. 51

work. In Fig. 51 (*a*) is shown one of the gables from the Francis I wing of the château at Blois, in which a royal crown pierced by the letter F forms the sole panel decoration. In (*b*) is illustrated the door head from the chapel of the château, with the crowned L and A, for Louis XII and Anne of Brittany, together with two shields, on which appear the fleur-de-lis, emblematic of the king, and the conventional ermine, the device of the queen. The latter is shown more in detail in (*c*), a chimney breast over a fireplace at Blois, where, on each side of the crowned A, are grouped tufts of ermine fur and also the "cordon," another device of the queen. In (*d*), on another chimney breast, between the crowned L and A, is a crowned porcupine, the king's personal emblem. The background of this example is made up of dolphins, which were the emblems of the princes of France that were next heirs to the throne. Above, in the frieze, is the cordon of Anne. In (*e*), a crowned central shield divided through the center contains, on each half, the fleur-de-lis and the ermine, respectively, while in (*f*), the crowned porcupine and crowned ermine are carved in full relief.

121. These animal emblems and other devices appear throughout the French Renaissance, and in many cases identify the period. The device of Francis I was a salamander and was carved in the dormer heads, similar to the F shown in Fig. 51 (*a*), in the side-wall panels, as shown in Fig. 32. The crowned H was used by Henry II, and was frequently interwoven with a C, for his queen, Catherine de Medici, or a D, or crescent, for his court favorite, Diana of Poitiers.

The painted arabesque panels of the French Renaissance were quite as elaborate as those of Italy, many of them having been executed by Italian artists or by French artists trained in the Italian schools. The designs are similar to the Italian school, but give less prominence to the mythological symbols than the designs found in Italy. The panels shown in Fig. 30 (*c*) and (*d*) introduce birds and

human figures with insects, festoons, and foliated devices, but without such direct symbolic references to the influences of the old classic mythology. Industrial and symbolic emblems, such as the palette, the pipes of Pan, the cornucopia, etc., were liberally introduced and all rendered in a brilliant and luminous manner.

REVIEW EXERCISES

1. What are the general characteristics of French Renaissance architecture?

2. (*a*) Into what periods is French Renaissance architecture divided? (*b*) What reigns are comprised in each?

3. What contrasting influences characterize the designs of French and Italian residences?

4. What are the principal structures of the Early French Renaissance period?

5. What are the characteristics of the (*a*) Early French Renaissance designs? (*b*) the Classic period? (*c*) Name one building of each period, and state briefly why it is classified in this period.

6. What political influences favored the introduction of Renaissance art into France from Italy?

7. To what succession of historical events does France owe her subjection to strong Italian influences for nearly a century?

8. What was the Edict of Nantes? (*b*) By whom was it made operative? (*c*) How long was it in force? (*d*) By whom and when was it withdrawn? (*e*) What effect upon the prosperity of the country did its withdrawal have?

9. Describe briefly some of the causes that led up to the French Revolution.

10. (*a*) What form of government followed the French Revolution? (*b*) By whom was it overthrown?

11. In what way was the architectural taste of the people affected by the overthrow of the French monarchy?

GERMAN RENAISSANCE

INFLUENCES

122. Geographical.—See German Romanesque Influences, *History of Architecture and Ornament*, Part 2.

123. Geological.—Absence of stone in Northern Germany caused designs to be worked out in brick. Molded and cut brickwork therefore strongly characterized the style.

124. Climatic.—See German Romanesque Influences, *History of Architecture and Ornament*, Part 2.

125. Religious.—Martin Luther, a priest of peasant origin, objected to certain practices of the Church that were authorized by the pope, and posted on all the church doors in the community his denunciation of the papal approval. For this act he was excommunicated from the Church. He and his followers protested against the edict passed in 1829 by the Diet of Spires, and thereafter Luther and his followers were known as Protestants. Luther translated the Bible into high Dutch, and thus caused that language to become the acknowledged German tongue.

126. Political and Historical.—Germany consisted of a number of small kingdoms, or principalities, each of which was ruled by its own king, thus preventing any national union of all sections, as was the case in France. From the election of Rudolph I of the house of Hapsburg as emperor, down to the reign of Maximilian of the house of Austria, there had been rulers elected from each of several states, but no one principality had controlled the reins of government long enough to unite the people into one homogeneous nation. With the ascendency of the house of Austria, however, Germany was destined to remain under the same line of rulers, with a short interruption, for nearly 400 years.

The reign of Frederick III of this house was a feeble one, but it saw the invention of printing by Gutenberg, which was destined to play such an important part in the Reformation and Renaissance. Maximilian I, son of Frederick, reunited the several states into a homogeneous empire. By marriage with Mary of Burgundy he acquired Burgundy, to which the Netherlands belonged, and he witnessed the beginning of the Reformation by Martin Luther. Under Charles I, his successor, Germany passed through one of the most remarkable periods in her history. Charles I was the son of Archduke Philip of Austria, and grandson of Maximilian. His mother was Johanna, daughter of Ferdinand and Isabella of Spain. Through his father he inherited the empire of Germany, while from his mother he received the kingdom of Spain. His vast inheritances, combined with his great ability, made him the most powerful emperor since Charlemagne. In 1516, Charles I succeeded Ferdinand as king of Spain; in 1519 he became emperor of Germany; and in 1520, he was crowned emperor of the Holy Roman Empire, under title of Charles V. Charles V and his successors supported the Catholics, and waged war against the Protestant princes almost constantly until 1648, when peace was declared and religious liberty granted.

England, Scotland, and Sweden joined in this war on the Protestant side, for the sake of religion, while France entered on the Catholic side, for her own aggrandizement. As a result of the peace, finally signed at Westphalia, in 1648, Germany was utterly ruined, Switzerland and the Netherlands were recognized as independent states, and France had risen to the leading power of Europe. Shortly after this time Louis XIV was pursuing his policy of aggrandizement, and the influence of France throughout Europe was so great that the German princes allied themselves with France against their Emperor, and all the little courts of the German states adopted the French language and imitated the immorality and prodigality that characterized the French court and was destined to cause its destruction at the hands of an enraged people.

CHARACTERISTICS

127. The characteristics of the German Renaissance lie chiefly in the quaintness and grotesqueness of its ornament, being due to the medieval traditions that were inherited from the previous style. The style was introduced from France about the time that France was going to the extreme in classic details. German Renaissance, therefore, is not so refined as the French style and its details are coarse and heavy. It had no artistic transitional period like that of the Francis I period, in France.

Germany, being an empire composed of a number of smaller principalities and kingdoms, does not present in its architecture any one dominating characteristic that unifies the style throughout the country. French ideas and even the French language were so popular throughout Germany at this time that it is not strange that the architectural detail of the Rococo period should be translated to the German constructions, but like all translations it naturally took a strong German accent. The German Rococo copied the scrolls, shells, cupids, and other details of the French style, but made them all heavier and bolder, thereby losing much of the delicacy and frothiness that was the only recommendation of this style of ornament. In France, the rococo decorations grew out of the exaggerated and excessive development of the papier mâché ornament of the Louis XIV style. In Germany, the rococo devices were borrowed directly without question of their origin or purposes.

This is due to the fact that the Renaissance was not introduced into Germany in the same manner as it was into France. The Italian wars of Louis XII, Charles VIII, and Francis I brought them directly into contact with the highly developed civilization of the northern Italian cities. These monarchs induced several Italian architects to return to France with them and introduce the new art, but it was not until the reign of Francis I that architecture generally showed strong Italian influences in France.

EXAMPLES

128. The rococo ornament of the period of Louis XIV and Louis XV was received into Germany and carried to

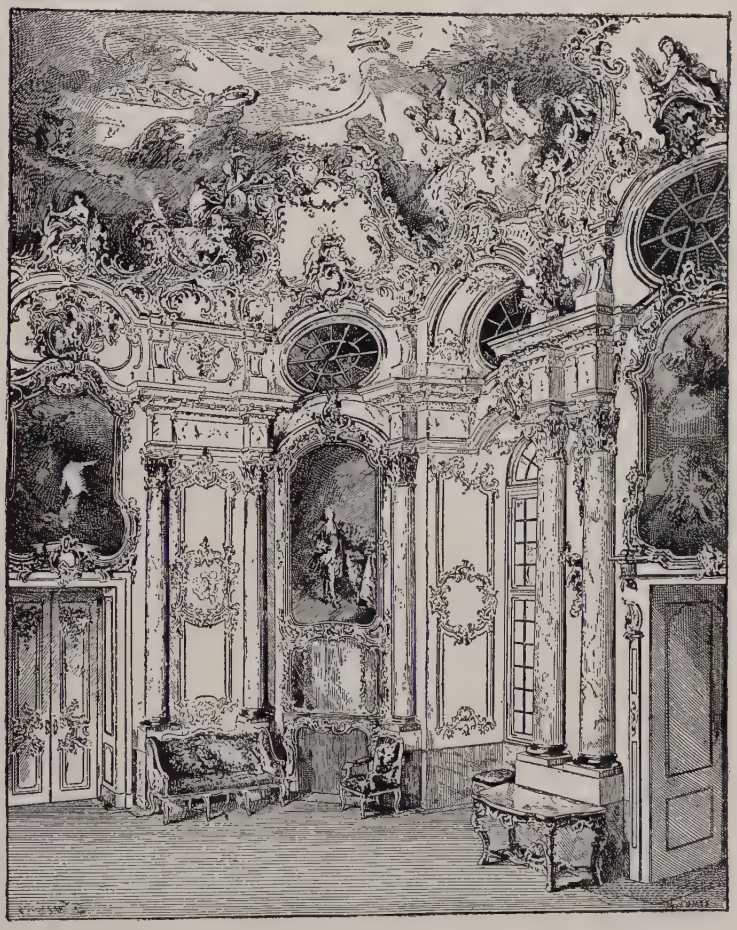


FIG. 52

even greater excess than in France. Fig. 52 shows a view of one corner of the state drawing room in the Palace Brucksal, at Baden, and indicates to what extremes this

frivolous detail can be carried when the decorator is unfettered by lack of either money or talented artists.

129. The Zwinger galleries, at Dresden, Fig. 53, are elaborately ornamented with carved cartouches, shields,

FIG. 53

festoons, and scrolls, interspersed with animal and human forms in great profusion.

130. Renaissance ran well up to the beginning of the 19th century, and at that time it adopted classic forms absolutely, without regard to their propriety or convenience.

FIG. 54

ANALYTICAL STUDY

PLANS

131. In German Renaissance, the French method of erecting buildings around an interior court was adopted, and the high, pitched roofs, containing many stories, were continued from the medieval period.

WALLS

132. The gable ends, instead of conforming to the pitches of the roof, assumed fantastic and irregular outlines, as shown in Fig. 54. Columns and pilasters were freely used as wall decorations, and in this manner, effects of

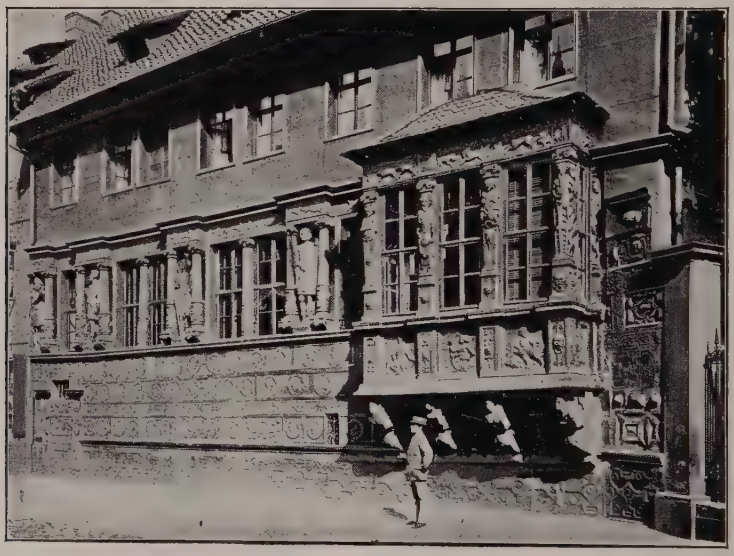


FIG. 55

great richness were frequently produced. The façade of the Kaiserhaus, at Hildesheim, is shown in Fig. 55. Here, the pilasters along the front bay window are carved into grotesque male figures supporting a frieze representing

figures from the hunt. Niches, whose tops are supported by Ionic columns, contain statues of the kings and emperors, and the entire lower façade is richly carved in medallions, giving the whole a decidedly ornate, though rather coarse, appearance. Brick and stone were used in combination, and also singly in many instances.

ROOFS

133. High, pitched roofs, with their ridges parallel with or at right angles to the street, were as numerous as in the Gothic period, and elaborate stepped and scroll treatment gave the gables great prominence where they faced the street (see Fig. 56). The sloping roof, as in the Gothic period, was characterized by numerous dormers when it was parallel with the street front, as shown in Fig. 57.

COLUMNS

134. The orders were adopted purely as decorative details and without regard to their classic traditions. Each story of a building was frequently marked with a horizontal cornice, but the columns or pilasters supporting it were frequently supported on projecting corbels instead of on independent pedestals. The faces of the pilasters, or narrow panels between the windows, were carved in arabesque patterns, and the columns were richly decorated with carved detail.

OPENINGS

135. In the early part of the period, the windows were large, mullioned, and crowned with grotesque scroll ornaments, instead of a pediment. Oriole windows were introduced both at the angles of buildings and in their façades, and late in the period severe classic forms were adopted, as in other countries.

MOLDINGS

136. The German moldings were heavy and lacked the refinement and purity of detail that characterized the French moldings.

FIG. 56

FIG. 57

BELGIAN AND DUTCH RENAISSANCE

INFLUENCES

137. Geographical, Geological, and Climatic.—See Dutch and Belgian Gothic Influences, *History of Architecture and Ornament*, Part 3.

138. Religious.—In 1556, Charles V, emperor of the Holy Roman Empire, abdicated and entered a monastery. The kingdom of Spain he gave to his son Philip II, and the imperial crown to his brother Ferdinand. Philip II continued the persecution of the Protestants begun by his father until the Dutch provinces rose in rebellion. After a struggle of 37 years, Spain was humbled and the Dutch republic was established. The Belgians, being mainly Catholics, adhered to Spain and were opposed to Holland during this struggle. Protestantism being thus established in Holland, church building there was in accord with the congregational idea.

On the division of the empire of Charles V at the time of his abdication in 1556, the Netherlands fell to Philip of Spain, and although this resulted in the cruelest persecutions of the Protestants under the Spanish Inquisition, it retained to the Dutch a full share of the commerce that was opened through the discovery of America and the establishment of the Spanish in the West Indies.

The Spaniards and the Dutch were so different in character, however, that there were constant clashes on both sides. Philip was determined to crush the progress of the Reformation, which had made a deep impression, and had spread rapidly in the Netherlands. War broke out almost immediately after Philip had become king of Spain and the smaller states of Holland united in a federation to support the Protestant cause. By the Peace of Westphalia in 1648, the

Netherlands were recognized as an independent power, while the more southern states, constituting what is now known as Belgium, remained under the dominion of Spain and retained the Catholic faith.

139. Political and Historical.—By the Peace of Westphalia in 1648, which closed the Thirty Years War, the Netherlands became an independent state. During the progress of their wars, the Dutch increased in wealth through their activity in trade. They established colonies in the New World and built the finest navy in Europe. The prosperity of the newly recognized state was prodigious and in maritime affairs it shared with England the supremacy of the world. Their achievements in science, literature, and art gained the admiration of Europe.

CHARACTERISTICS

The character of the Dutch is clearly shown in their architecture. Their buildings are plain, matter-of-fact structures, more useful than beautiful. Being a frugal and saving people, they did not erect great monuments with their newly acquired wealth. Their churches were barn-like structures, planned for comfort and convenience, but nothing on a large or monumental scale was projected.

140. In Belgium, the designs were wild and eccentric, but picturesque, while Dutch examples are extremely plain. Brickwork was given much prominence, particularly in domestic architecture, and the design of interiors and furniture was given close consideration.

The fantastic and grotesque extremes of the German rococo influenced the development of the Renaissance in Holland and Belgium, though these countries were extremely slow in accepting the principles of Renaissance art. Long after the beginning of the 16th century, the Flemish architects continued to employ the florid Gothic for both religious and secular structures; and during the time that Holland was a Spanish province there is a strong suggestion of Moorish oddities intermingled with crude German rococo ornament.

287

FIG. 58

EXAMPLES

141. Church du Béguinage.—The Church du Béguinage, Fig. 58, at Brussels, is a typical example of the Flemish style. The absence of building stone in this locality made brick construction the prevailing practice, and the long,

Fig. 59

untapering, Ionic-capped, brick pilasters on the façade of this building show how ignorant the Flemish architects were of the origin and meaning of the forms they were copying. In the second story of the façade, the semidetached composite columns are built up of brick, with a studied entasis, but are backed with pilasters that are straight.

142. The treatment of the gables in Fig. 58 shows to what absurd extremes ornamentation can be carried when not properly understood. The low pediment of Greek art was developed by Gothic architects into the peaked gable to suit the climate of Northern Europe; but here is a gable front that does not conform to the outline of the roof behind it and that falsely declares itself to be the end of that roof. The scrolled outline of this gable, as well as the scheme of decoration around the door and windows, owe their existence to the perverted rococo of Germany; while the circular and elliptical windows are inventions of the later Renaissance in neighboring countries.

The civic architecture that characterized the Late French Renaissance and led to the erection of many public buildings and palaces is not found in the Netherlands, as the strong Italian influences for monumental structures were neutralized by the strong feeling for domesticity. There is really no Renaissance architecture here in the true sense of the term, as the ideas were borrowed not from the classic Roman architecture, but from the French, German, and Spanish interpretations of the classic, and greatly modified by the characteristic desire for simplicity.

The domestic architecture was the model for the civic buildings, and the residences, warehouses, markets, and town halls were simple brick and stone structures with the stepped gables and the liberal windows and with walls but little elaborated with sculptured ornament.

143. The Market at Haarlem, Fig. 59, is characteristic of this class of buildings. The stepped gable so prominent in the façade of the dwellings is here enlarged and adapted to a structure of a public character. Alternate courses of stone and brick give variety to the front, while carved cartouches are sparingly introduced into the wall spaces. Scrolls and rococo details borrowed from both France and Germany are adopted as ornament, but with a certain amount of restraint, for excess in anything is contrary to the Dutch characteristics.

ANALYTICAL STUDY

PLANS

144. The development of domestic architecture during the Gothic period established a general system of planning that was followed during the Renaissance.

WALLS

145. Grotesque gables characterize the style throughout. Wild curves, derived from the rococo ornament of France and Germany, where the style was already on the decline, were used in the outlines.

ROOFS

146. The roofs continued to be high and steep, with many elaborate dormer-windows and towers. The chimneys stand out boldly and add to the picturesque grouping.

OPENINGS

147. Windows were numerous and were crowded closely together. Pilasters with fluted or paneled faces flanked the jambs of windows, while entrance doors were treated with columns and entablatures.

MOLDINGS

148. The moldings were coarse and not well proportioned to the material in which they were executed.

ORNAMENT

149. Various grotesque forms were carved to fill panels or other vacant spaces that could not be otherwise utilized. The motifs were usually of Italian origin, but were worked over and corrupted by the Dutch artists until their original form was lost almost entirely. Much carved ornament was executed in wood.

SPANISH RENAISSANCE

INFLUENCES

150. Geographical, Geological, and Climatic.—See Spanish Gothic Influences, *History of Architecture and Ornament*, Part 3.

151. Religious.—The Reformation made no headway whatever in Spain. Charles I, who succeeded to the throne of Ferdinand and Isabella, was appealed to by the pope to help stamp out the heresy started by Luther. As Charles V, he became emperor of the Holy Roman Empire and did all in his power to uphold the Church and the pope. On the abdication of Charles V, Philip II succeeded to the throne of Spain, and endeavored to root out Protestantism both at home and in the Netherlands, by means of the Inquisition. The result of this was the decline of the brilliant career for Spain started under Ferdinand and Isabella and culminating in the empire of Charles V.

The Inquisition was an ecclesiastical court established in the 12th century for the suppression of heresy and the punishment of heretics. It was developed in the 13th century by Pope Innocent III, and its operation extended to France, Spain, Germany, Italy, and other countries. The Spanish Inquisition was put under the control of the king in the 15th century and became noted for the severity of its acts and the number of its victims. Thousands of suspected heretics were burned alive or subjected to the cruelest tortures.

152. Political and Historical.—The opening years of the 16th century found Spain the leading power in Europe. Under Ferdinand and Isabella the Moors had been conquered in the last decade of the previous century, and Columbus

had added to the wealth and glory of Spain through the discovery of America.

Johanna, daughter of Ferdinand and Isabella, married Philip I, son of Emperor Maximilian. Spain thus became part of the Hapsburg empire. Charles I, their son, succeeded Ferdinand in 1516 as King of Spain, and in 1519, under the title of Charles V, he became emperor of the Holy Roman Empire—a vaster realm than that of any previous monarch except Charlemagne. The severity of his successor Philip II and the Inquisition alienated many of his subjects, and led to the rise of the Dutch republic, which lost the Netherlands to him forever. Spain was later defeated by England, and provinces were gradually lost, so that she made little or no progress during the Renaissance period when other nations were accomplishing so much.

CHARACTERISTICS

153. Spanish Renaissance is rich, florid, and fanciful. The early work is interspersed with details from the Moorish style, while the construction adheres to the Gothic. The details are small and finely executed, little consideration being given to the orders as structural details. Later, the style assumes more classic proportions, and ends in the wild extravagances of the rococo, as it did in other countries.

EXAMPLE

154. Hotel de Ville.—The Hotel de Ville, or City Hall of Seville, Fig. 60, is characteristic of the early period of the Spanish Renaissance. The pilasters in the first story, with their paneled faces and rich arabesque carvings, are not proportioned according to the rules of Vignola, but are designed to suit the existing conditions. In the upper story, the columns are fancifully designed, without a thought of classic precedents, and the carving throughout the façade is executed independently of any hard-and-fast rules derived from Rome.

293 FIG. 60

ANALYTICAL STUDY

PLANS

155. In churches, wide naves prevail, sometimes without aisles. Over the crossing, domes are common, and the transepts are generally small. In residences, the *patio*, or court is almost universal and resembles the inner courts of Italy. Largeness of scale is characteristic of palaces and churches.

WALLS

156. Brick, stone, and granite were freely used. Gables were rarely employed and great wooden cornices were planted on top of the wall surface. In churches, the walls were left plain in stonework on the interior, to be hung with tapestries.

ROOFS

157. The roofs were flat, or low in pitch, and the towers were completed with spires of slate or lead. Interior ceilings are usually richly coffered in wood.

COLUMNS

158. The early columns were light and fanciful in design. Shafts were frequently baluster-shaped and were decorated in low relief (see Fig. 60), a characteristic feature in the bracket capital that appears only in this country. As the style advanced, classic correctness prevailed until superseded by the rococo.

OPENINGS

159. Doorways were emphasized by means of columns, pilasters, or other striking details, and were large in size, owing to the fact that the entrance, or gateway, is a feature

of special importance among the Oriental people, a characteristic inherited from the Moors. Windows were protected by elaborate iron grilles, and were surrounded by a border of carved panels, like a frame, or were flanked with simple, carved pilasters.

MOLDINGS

160. Gothic and Moorish influences combined to produce moldings of great refinement in the Spanish Renaissance. Entablatures are carried out and around detached columns and pilasters, giving a variety of outline and shadow effect.

ORNAMENT

161. The sculpture of this period varies in merit, but is usually dull and wanting in decorative treatment. Tilework in Southern Spain is excellent. Stained glass was vivid in color and showed Flemish influences. Ornamental ironwork, consisting of railings, grilles, window screens, gates, etc., was greatly developed by the Spaniards.

REVIEW EXERCISES

1. Describe briefly the political relations that existed between Germany, Spain, and the Netherlands during the first half of the 16th century.
2. (*a*) What was the Thirty Years War? (*b*) What countries took part in it? (*c*) What was its result?
3. What was the influence of France on German affairs at the close of the 17th century?
4. What commercial advantage fell to the Netherlands when the empire of Charles V was divided?
5. (*a*) What was the Peace of Westphalia? (*b*) What advantage resulted to the Netherlands through the Peace of Westphalia?
6. What was the Spanish Inquisition?

ENGLISH RENAISSANCE

INFLUENCES

162. Geographical.—While England's isolated position was especially advantageous in the development of the Gothic style, which grew up there free from any foreign influences, it was decidedly disadvantageous for the artistic interpretation of the Renaissance style. Gothic architecture and ornament were based on serious problems of construction and types derived from nature, the former being solved by local intellect, and the latter supplied by the local natural growths. Renaissance architecture and Renaissance ornament were one and the same thing by the time the style had affected England. The construction was Gothic, on which the classic architectural forms were grafted purely for decorative effect. At this period, however, the continent of Europe was disrupted by almost constant war, and travel from England to Italy being a matter of great difficulty, few of her architects studied the Renaissance on Italian soil, but rather pursued their investigations in countries nearer home. Ideas borrowed from the Netherlands, where the style was already corrupted, tended to reduce the English Renaissance to a style more freakish and eccentric than that of any other in Europe.

163. Geological.—With the increase of population, wood was becoming scarce, and timber architecture so characteristic of the middle ages gradually disappeared. Portland stone, similar in appearance to the material used in the Renaissance palaces of Venice, influenced the style somewhat, and Holland influences made brick a popular material, particularly in London after the great fire of 1666. The development of a great coal industry cheapened fuel, in

consequence of which nearly every room had its fireplace and numerous chimneys broke the roof line.

164. Climatic.—See Climatic Influences under English Gothic, *History of Architecture and Ornament*, Part 2.

165. Religious.—In the early part of the 16th century, a general upheaval in religious matters was felt all over Europe. The supreme power of the pope over all matters of religion, as well as of state, was found to be irksome to the English, and when the Church began to impose on the ignorance of the people for her own aggrandizement, there was a revolt. King Henry VIII of England renounced the pope as the supreme head of the Church and elected himself to that sublime office. The pope then excommunicated the king from the fellowship of the Church and declared him to have forfeited the allegiance of his subjects.

Henry then had Parliament pass a law to the effect that any English subject that denied the king's right to the title of head of the Church would be held guilty of high treason and put to death. Henry seized and suppressed all the monasteries in England and distributed the lands and money they possessed among his courtiers. The monasteries themselves fell to ruin or were converted into cathedral churches. Others were demolished and manor houses erected on the estates composed of the forfeited lands. Thus arose in England the desire and taste for comfortable residences, which culminated, in the age of Elizabeth, in the characteristic English mansion.

166. Political and Historical.—The reign of Henry VIII in England (1509 to 1547) was contemporaneous with that of Francis I in France. His court included many foreigners whom he had invited to England to further the Renaissance movement.

Among these were Holbein, an artist from Basle, Germany; Torrigiano, a Florentine sculptor and architect, who had studied under Michelangelo; John of Padua, another Italian architect; and several others. A number of schools and colleges were erected at this time with the funds derived from

the suppressed monasteries, and these with their educational systems contributed largely to the development of the style.

Henry VIII was married six times, and three of his children by three different wives were to ascend the English throne. In 1509, he married Catherine of Aragon, a daughter of Ferdinand and Isabella of Spain, who was naturally, like himself, an ardent Catholic. He condemned the Reformation under Luther so strongly that he received from Pope Leo X the title of Defender of the Faith. In 1533, however, when he wanted to divorce Catherine and could not get the papal sanction, he repudiated the pope's authority and married Anne Boleyn. For this he was excommunicated by the pope, but immediately in 1534 caused parliament to pass an act declaring him and his successors to be head of the church. He had Anne Boleyn beheaded in 1536, and the day after the execution he married Jane Seymour.

Henry died in 1547 and was succeeded by Edward VI, his son by his third wife, Jane Seymour. Edward reigned 6 years and encouraged the Reformation; then his half sister Mary, daughter of Henry's divorced wife, Catherine of Aragon, came to the throne. Mary restored the Catholic faith and to strengthen it she married Philip II of Spain, but when she died in 1588, Elizabeth, daughter of Henry's second wife, Anne Boleyn, ascended the throne.

167. The reign of Elizabeth was the most progressive era in the history of the country. Elizabeth restored Protestantism as the state religion, and the Catholic powers of Europe formed many schemes to dethrone her and elect a Catholic in her place. Spain was particularly aggressive in this, and finally attempted an invasion of England by land and sea. A fleet of 129 ships therefore set out with 20,000 men to cooperate with a further land force of 34,000 that was to join them from the Netherlands. This expedition was a total failure. The fleet was practically destroyed, the land force discouraged by the outlook, and consequently the power of Spain in the affairs of Europe reduced to nothing. Protestantism gained in strength and the Huguenots in France took courage.

Elizabeth continued the good work of school building and encouraged the erection of great domestic mansions. Workmen and weavers came to England in large numbers from the Netherlands and Germany, and later, numerous Huguenots came over from France, thus influencing the style materially with much foreign feeling and detail. After Elizabeth came her uncle, king of Scotland, who ruled in England as James I from 1603 to 1625.

Charles I reigned from 1625 to 1649, but he constantly disagreed with the parliament and civil war broke out with the result that the king was beheaded in 1649. England was then governed as a Commonwealth under Cromwell, the leading general in the late war on the parliament side, but the Commonwealth became unpopular and the people clamored for the return of royalty, so Charles II, son of the beheaded monarch, was crowned in 1660 and reigned until 1685. Charles was too much under the influence of France, and inflamed the people by the extravagances of his court and his leaning to the Catholic faith, and when his successor, James II, came to the throne in 1685 and further favored the Catholic party, parliament invited foreign interference from the Netherlands. The king's daughter, Mary, had been married to William, Prince of Orange, and was a Protestant. William and Mary were invited to take the English throne and in 1685 they landed at Torbay with 15,000 men. James II fled to France, where he died later, a pensioner of the court of Louis XIV.

After William and Mary came Anne (1702 to 1714), second daughter of James II.

After the rise of Holland and when William of Orange came to the throne of England, architecture was much affected by Dutch details; and later, when George I of Hanover became king, a period of development in domestic architecture set in that lasted until the middle of the 18th century.

CHARACTERISTICS

168. English Renaissance may be divided into three general periods: the **Elizabethan,** the **Anglo-Classic,** and the **Classic Revival.** Some authorities make further subdivisions, but, generally speaking, the ones just mentioned comprise the only real differences.

When the great Renaissance movement was born in Italy, which was then the ecclesiastical center of the world, it was impossible that its influence should not be felt in every Christian country. The force of this influence was checked in England by the break between the English church and the pope. The influence of Italy is shown in the regularity and symmetry of the plans and in the attempt to use the orders, but with a very indefinite idea of their proportions. Otherwise there was little to associate Elizabethan architecture with the Renaissance of Italy. There is neither the spirit nor the intelligence expressed in the Italian style, but there is a charm and simplicity about it that renders the Elizabethan mansion unique and characteristically English. As the majority of the great families lived in the country, their homes were enhanced by the simple rural surroundings, gardens, terraces, and exterior adjuncts that contribute to the establishment of the perfect country seat.

With the Anglo-Classic period came the days of Italian books, study, and travel. English architects studied in Italy and in France. The distinctive English characteristics of suitability and unpretentiousness gave way to complication of plan and elaboration of exterior in order to display the classic details. Much was planned for show and little for comfort.

The Classic Revival period was similar to the Empire period in France, when Greek and Pompeian ideas superseded the Roman orders and details. Libraries, museums, galleries, banks, etc. were designed, but appeared to be Greek temples and tombs. These incongruities rendered the style short lived, and many designers abandoned the classic and endeavored to institute a revival of the Gothic.

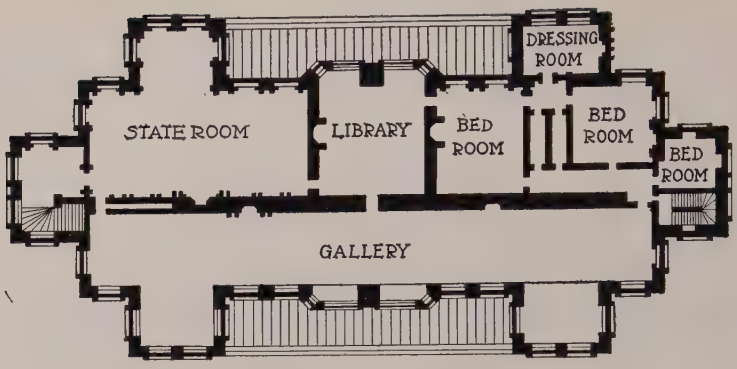
ANALYTICAL STUDY

PLANS

169. The Renaissance in England presents practical designs in house planning with consideration for the comforts and conveniences of the occupants; and from the Elizabethan plan have been derived many details that characterize the homes of the present day.

Two types of plan were adopted at this time—one, where a long hall connected the kitchen and offices at one end of the building with the living room at the other end, and the other where the plan was quadrangular, with a central court, as in the middle ages. The latter plan was improved by the omission of the buildings on one side, thus converting it into an **E** shape, as at Hatfield House, Fig. 60, *History of Architecture and Ornament*, Part 3. Later, the wings were extended on each side and the plan became **H**-shaped.

The principal details of the plan were the *great hall* —inherited from the medieval period—which was usually wainscoted in oak nearly to the ceiling; the *minstrel gallery*, which was located at one end of the hall, above a tall oak screen; the *dais*, or *raised platform*, which was enclosed in a bay window whose sill came nearly to the floor; and the *great-hall fireplace* with elaborately carved coat of arms of the owner. The staircase was also an important detail in all Elizabethan mansions. It was designed with heavy newels, pierced balustrades, and richly carved details. It owed its prominence to the fact that many of the most important rooms were on the second floor and therefore demanded a monumental means of approach. Another characteristic detail of the Elizabethan house was the *long gallery*, as shown in Fig. 61 (*a*). This gallery was usually located in an upper story and often extended the full length of the house. The side walls were paneled and the ceilings were richly decorated in plaster ornament.

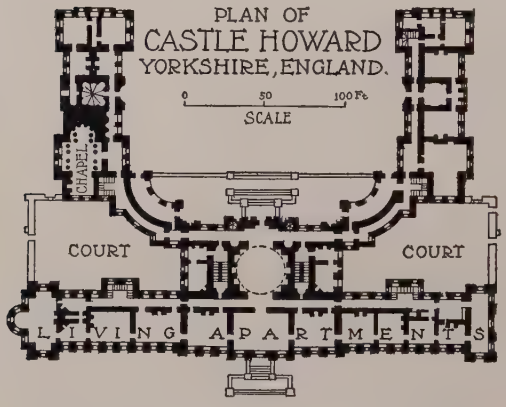


PLAN OF SECOND FLOOR OF HARDWICK HALL.

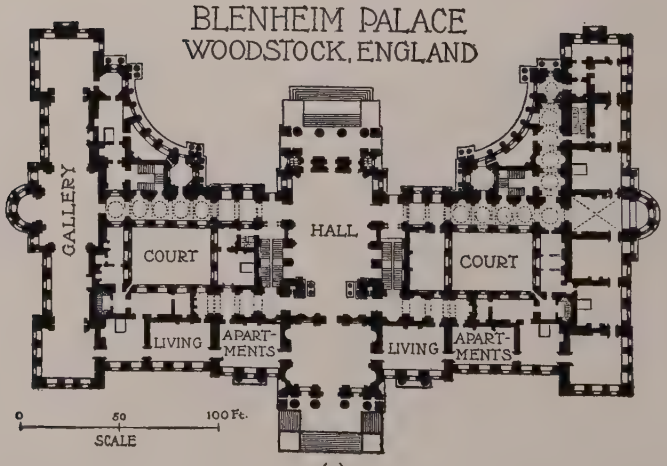
0 50 100 Ft.

SCALE

(*a*)



(*b*)



(*c*)

FIG. 61

303 FIG. 62

WALLS

170. The elevations were freely treated, with the classic orders used in a rather grotesque form and interspersed with much intricate ornament of either Flemish or German origin. The tower of the Old Schools at Oxford, Fig. 62, erected about 1612, presents a unique example in which all the five orders are introduced. These columns are superposed one over another, with the Tuscan at the bottom and the composite at the top. The gables, or pediments, consist of scrollwork combinations, somewhat after those of Holland, but with much pierced screenwork and balustrades. At a later period, the classic pediment was used more intelligently, and over the gate of Caius College, Fig. 63, erected in the years 1665 to 1674, are found a tetrastyle portico used as a decorative wall detail.

FIG. 63

The chimneys were a characteristic feature, sometimes being elaborately treated with orders and at other times carried up in cut brickwork, thus playing an important part in the sky line of the roof. Where battlements surmounted the walls in the Gothic period, parapets are now found pierced with elaborate fretwork and scrollwork designs, or arranged with balustrades and pilasters or with newels.

ROOFS

171. The roofs were both high in pitch, after the Gothic model, and low and flat, after the classic style. They were covered with either lead or tile, and in some districts, with stone slabs. In nearly every case, the roofs were surrounded by the characteristic pierced balustrades. The gables took fantastic forms, with curved or stepped outlines, as in Holland.

COLUMNS

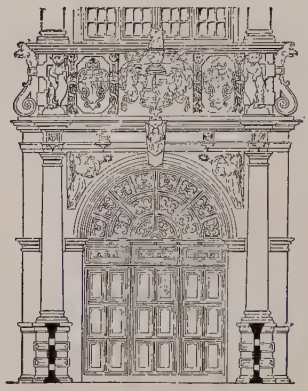
172. The columns are founded on classic orders, but with a great variety of treatment. They frequently tapered toward the base, without entasis, and sometimes they were designed with bulbous swelling, somewhat after the classic balustrades. Pilasters flanking window openings were a prominent detail on the exterior. These were paneled and decorated in strapwork ornament or sometimes fluted as in Italy.

OPENINGS

173. The cheapness of glass rendered large square windows an important feature and these were flanked with pilasters so as to emphasize the structural character of the opening, whereas in Italian work the pilaster was used on the exterior simply to subdivide the wall surface. See Fig. 16. Bay windows were a prominent feature, as may be seen from the plans shown in Fig. 61. Large, mullion windows with transoms are as characteristic as they were in the Late Gothic period. The doorways were elaborately studied, with the orders carried above them several stories, as in the Old Schools at Oxford, Fig. 62.

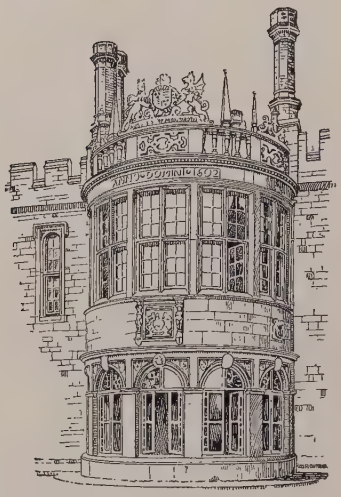
MOLDINGS

174. The moldings are coarse and crudely carved, but are based on classic models. The characteristic cornice consists of a large cyma supported on a small ogee, over a rather shallow corona.



(a)

(b)



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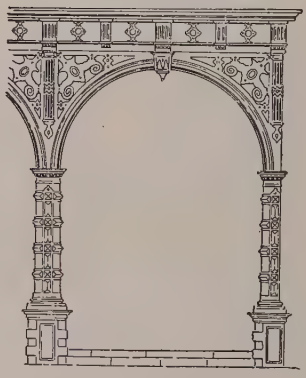
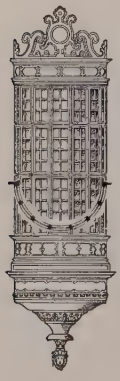


(d)



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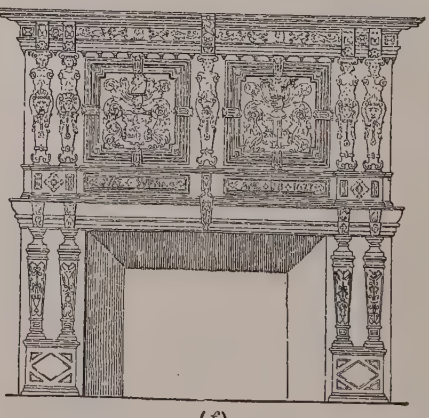
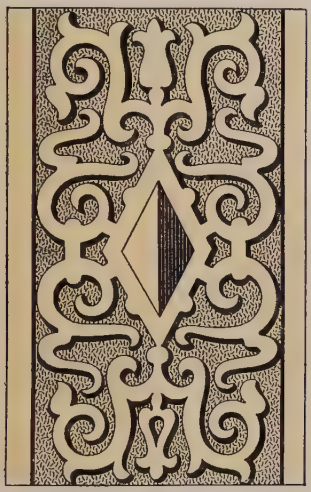


(f)

FIG. 36

(a)

(b)



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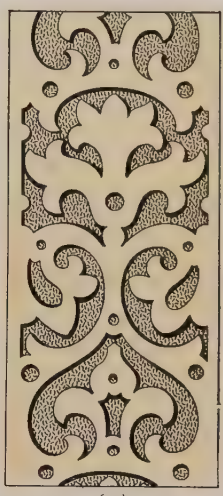

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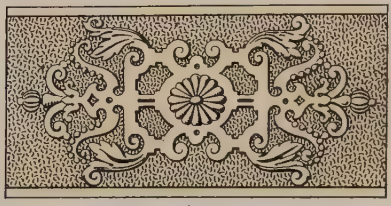
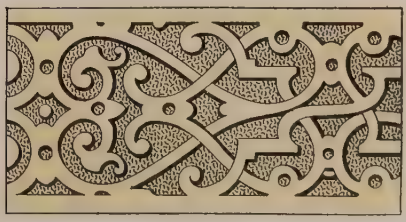


(g)

(h)



(i)

FIG. 64

ORNAMENT

175. The characteristic ornament of this period consists of a strapwork design interlaced with scrolls and grotesque patterns, as shown in Fig. 64, which were apparently secured to the ornamented surface by square-headed nails or rivets. This style of decorative treatment was used on pilasters, panels, spandrels, etc., and even pierced through parapets to form a sort of openwork balustrade, as shown in Fig. 65 (*a*). Grotesque figures were used on newels and as terminals to supports, instead of regularly molded columns and capitals as in (*f*). Some columns were rusticated by the introduction of prismatic forms that were either carved in the shaft or inserted in colored stones, as in (*d*). Plaster was run in molded panels for ceilings, and considerable richness of design resulted from this treatment. Pyramidal finials were carried on pedestals over screens and bays, as in (*b*), and molded strapwork filled the spandrels, as in (*d*). Bay and oriole windows characterized the exterior walls of the residences, as in (*c*) and (*e*), and the chimney stacks were carried high above the parapet walls and battlements in octagonal prisms.

The details of ornament shown in Figs. 64 and 65 can be classified as Renaissance on account of their historic period rather than on account of their classic spirit. England was not in harmony with the Italian movement and borrowed many of her ideas from Holland, which, being a Protestant country, was more in sympathy with the English church. The Gothic ornament, which was the expression of true structural conditions, still influenced the English style as to form, but the Elizabethan ornamentation was independent of construction even when based on Gothic types. The lath-and-plaster vaults of the Italian corridors, and the deeply coffered ceilings with plaster beams and ornament, influenced England only so far as material was concerned, but until the Anglo-Classic period, when direct study of the Italian forms led to their better appreciation, the ornament of the English Renaissance was meaningless and superficial.

ELIZABETHAN PERIOD

176. Although 50 years later in date, the Elizabethan style in England corresponded with the Francis I period in France, inasmuch as it was the transition style from the old to the new forms. During the reigns of Henry VII and Henry VIII, the Gothic style was on the decline, and with the Reformation came the desire for the new forms, which were grafted on the Gothic constructions without consideration for their classic purposes. The new forms that were revolutionizing architectural design in other countries were essentially Italian, and to the English reformers anything that was Italian was a reminder of the Roman church. The Elizabethan architects therefore endeavored to introduce forms that were not directly of Italian origin, or that were so modified that all associations with the unpopular religion were eliminated. The Renaissance details of Italy were therefore scorned as Catholic, but their modifications as found in Holland and France were adapted to English conditions.

The most important examples of the Elizabethan period are country houses; and landscape gardening thus became a distinctive feature of the style. The structural details so characteristic of the Gothic were long retained; hence, many uses were made of the tower, the bartizan, the oriole window, the mullioned bay, etc. The Elizabethan style not only applied Italian architectural forms to English Gothic constructions, but also borrowed ornament for the same purpose from all the ornamental arts in furniture decoration, etc.

177. As classic literature and models became better known and the use of the orders became more general, the style developed toward a crude classicism, sometimes termed the *Jacobean period*, as it was identified with the reign of James I, who succeeded Elizabeth. The planning remains about the same, but the ornamentation and furniture introduced all sorts of grotesque absurdities that never found a place in classic art.

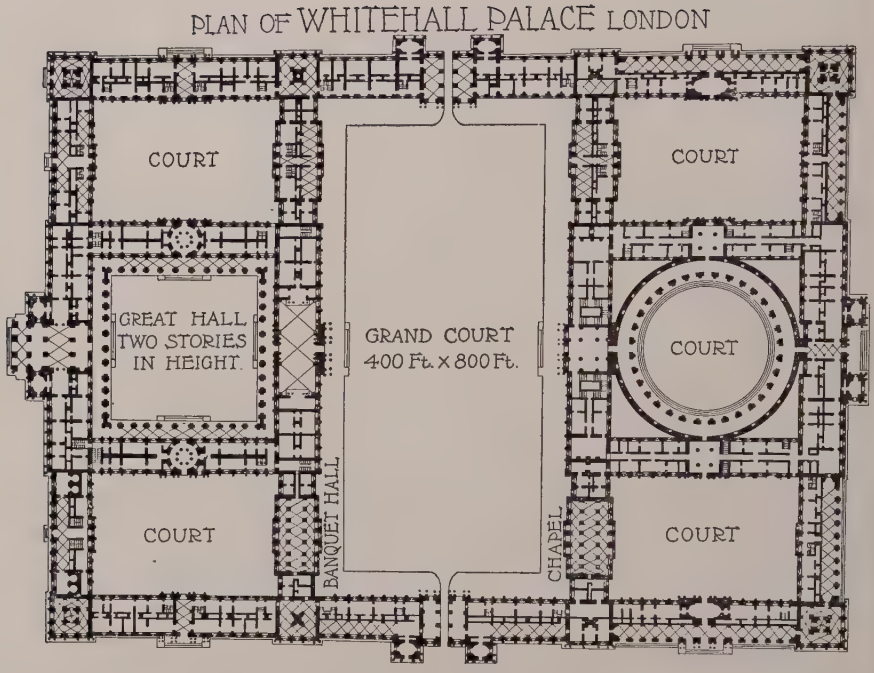
ANGLO-CLASSIC PERIOD

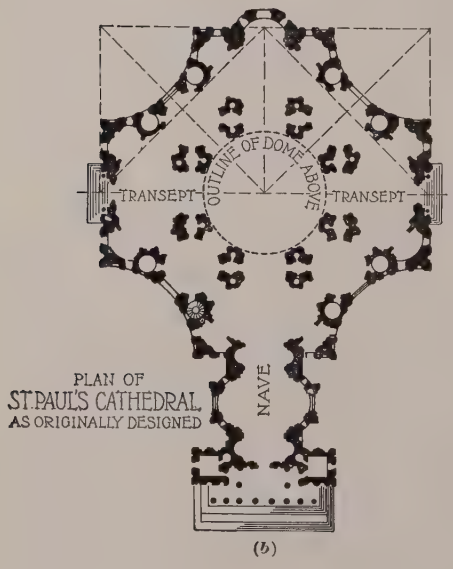
178. The Anglo-Classic period extends from 1625 to 1702, and includes the reigns of Charles I, Cromwell, Charles II, James II, and William and Mary. As in the Italian school, the classic period of English Renaissance was popularized by the work of individual architects, the first of whom were Inigo Jones and Sir Christopher Wren. Inigo Jones took a long course of study at Vicenza, Palladio's native town. Palladio was the favorite master of Jones, and the works of this Italian architect had much influence on the designs executed in England after Jones returned.

The greatest undertaking of Inigo Jones was the design for Whitehall, the royal palace at London. This was one of the grandest conceptions of the Renaissance, but only the banquet hall was ever built. The plan, Fig. 66 (*a*), was arranged around courtyards, one of which was to be circular and surrounded by a peristyle, and the great central court would have equaled that of the Louvre. The banquet hall, Fig. 67, is certainly as dignified a composition as will be found in the English Renaissance. It was treated as a two-story structure on the exterior, while the single room it consisted of was two stories high, with a balcony on the interior from which the second-story windows opened.

179. Sir Christopher Wren was a mathematician, and his early training fitted him for the great structural problems that he solved in his latter works. He did not possess an architectural education equal to the one that Jones had received in Italy, but he studied the art in France while the Louvre was undergoing reconstruction, and all his work shows the influence of the French school quite as strongly as the work of Jones shows the Italian style. This is particularly evident in the decorative detail. Wren probably built more churches than any other architect.

The great fire of London, which occurred in 1666, destroyed 89 churches and over 13,000 houses in less than a week.


PLAN OF WHITEHALL PALACE LONDON
COURT
COURT
GREAT HALL
TWO STORIES
IN HEIGHT
GRAND COURT
400 Ft. × 800 Ft.
COURT
COURT
COURT
BANQUET HALL
CHAPEL
(a)


OUTLINE OF DOME ABOVE
TRANSEPT
TRANSEPT
NAVE
PLAN OF
ST. PAUL'S CATHEDRAL
AS ORIGINALLY DESIGNED
(b)

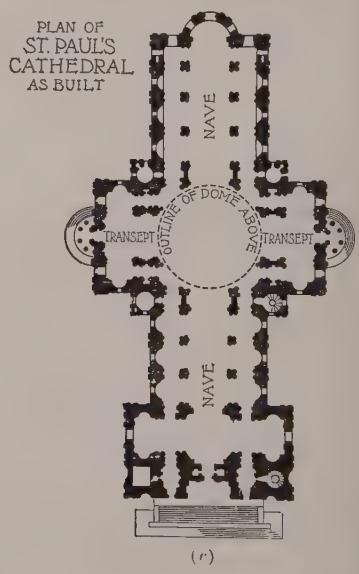

PLAN OF
ST. PAUL'S
CATHEDRAL
AS BUILT
NAVE
OUTLINE OF DOME ABOVE
TRANSEPT
TRANSEPT
NAVE
(c)

FIG. 66

FIG. 67

Before the embers were cold, Wren set before the king a scheme for the restoration of the city. The plan was not accepted, but Wren rebuilt 52 churches, including St. Paul's Cathedral.

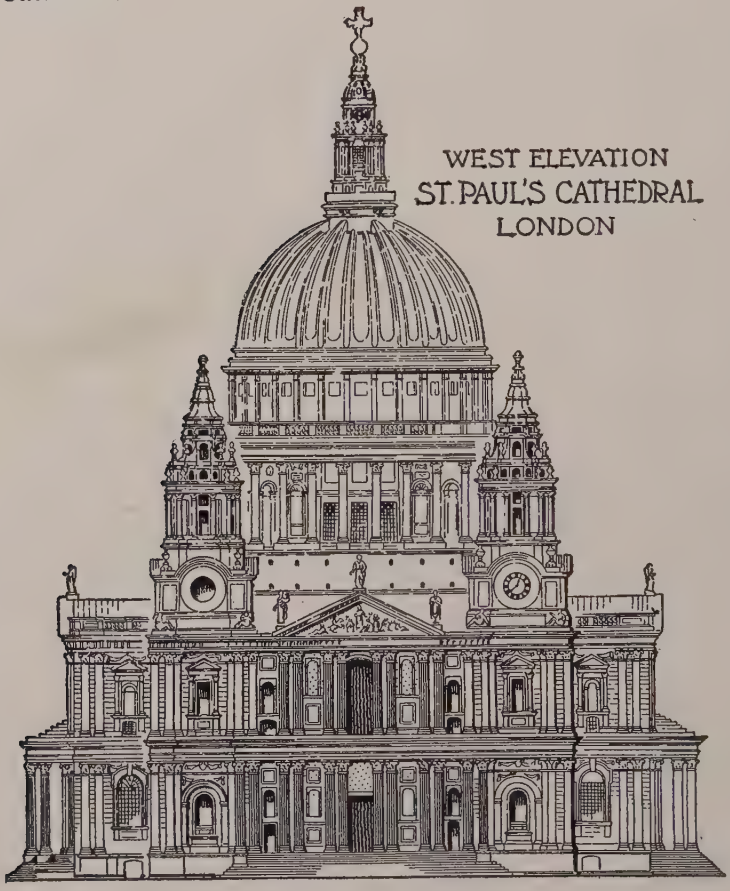


FIG. 68

180. St. Paul's Cathedral.—St. Paul's was Wren's masterpiece, and ranks with the finest Renaissance cathedrals in Europe. His first plan, Fig. 66 (*b*), presented a Greek cross with an extended west arm laid out with geometrical precision. The clergy, however, objected to this,

as it was a digression from the medieval style of planning. Wren then made a plan in the form of a Latin cross, Fig. 66 (*c*), with the great central space at the crossing crowned by a dome of magnificent proportions, as shown in Fig. 68.

The exterior of St. Paul's is designed in two stories, as shown in Fig. 68, the upper one being a mere screen to hide the buttresses and clearstory, as shown in Fig. 69 (*a*), which is a transverse section across the nave—a deception that illustrates the impracticability of the classic decoration on the Gothic construction. If the buttresses had been permitted to show on the exterior, they would have been incongruous with the classic detail; and, on the other hand, had the roof been constructed according to the Roman methods, the building would have been ill suited to the purposes of a Christian church.

181. The most important feature of the design is the dome over the rotunda. This detail is also an architectural deception practiced to heighten the effect of the design on the exterior. If the dome were hemispherical and poised directly over the vault of the nave, as in the Byzantine churches, it would have added dignity to the interior without being at all visible on the exterior. Had it been designed to suit the exigencies of the exterior design, it would have appeared strangely lofty and out of place from within. Therefore, in order to reconcile these two conditions, Sir Christopher built a dome over the rotunda to secure the desired interior effect, as shown at *a*, Fig. 69 (*b*); around the circumference, and independent of this dome, he constructed a conical brick roof *b*, on top of which is supported the stone lantern *c*, and around the sides of which a wooden dome *d* is built entirely for exterior effect. This exterior dome, rising from a high drum surrounded by a peristyle of Corinthian columns, gives to the design an expression of dignity and majesty that would otherwise be entirely lacking; while the campaniles, or bell towers, and the two-story porch on the west front combine in an admirable grouping with the dome itself.

TRANSVERSE SECTION
ST PAUL'S CATHEDRAL
LONDON
SCREEN WALL
AISLE
NAVE
AISLE
a
b

(a)

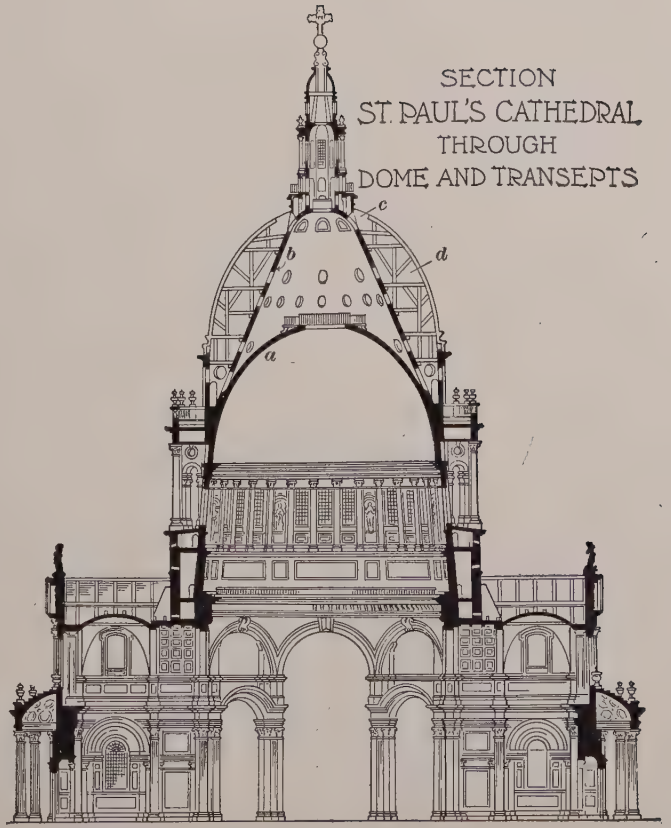

SECTION
ST. PAUL'S CATHEDRAL
THROUGH
DOME AND TRANSEPTS
a
b
c
d

FIG. 69 (b).

182. Church of St. Mary le Bow.—Wren's smaller churches were well studied in plan and detail. It may be said that he of all architects was most successful in applying classic details to spires. His best work in this particular

FIG. 70

was the church of St. Mary le Bow, Fig. 70. The tower is rectangular in plan to a height of 112 feet, and is then surmounted by a circular peristyle supporting inverted consoles under the lantern. The diminution in size as the spire rises

FIG. 71

FIG. 72

is admirable, and the inverted consoles give a variety to the outline that could have been attained in no other way.

183. Church of St. Bride.—Another unique design of Sir Christopher's is the little church of St. Bride, Fig. 70. Here, the square tower is carried up to a height of 123 feet, and the diminution of the spire is effected by a series of five decreasing arcades supporting a cone.

184. Other Examples by Wren.—Besides the churches that he built, Wren was called on to design more royal palaces than any other architect, before or since his day, but in this field he did not meet with the success that crowned the majority of his ecclesiastical designs.

The palace at Winchester was little more than a big brick barrack, to which purpose it has since most appropriately been applied. He was more successful with Hampton Court, though the design shows a want of proper study. The architectural orders are plastered on simply as exterior ornaments, and the entire façade is tame and meaningless. Chelsea College is probably the poorest design bearing Wren's name ever erected, but he partly redeemed his fame in the one at Greenwich, though this is not up to his standard.

When Sir Christopher Wren died, in 1723, he was succeeded both in practice and position by Nicholas Hawksmoor and Sir John Vanbrugh. The former was a pupil of Wren's, and was employed to carry out a great deal of his work.

185. Works of Vanbrugh.—The works of Sir John Vanbrugh are all expressive of his one aim and desire, namely, to express in design a feeling of grandeur and eternity. Had his efforts been devoted to mausoleums and monumental structures, he might have made much more of a success; but as his productions were almost entirely palaces and villas, his energy was spent in the wrong direction. Blenheim Palace, Fig. 71, Castle Howard, Fig. 72, Seaton-Delaval, and Grimsthorpe all bear the stamp of his ambition.

186. Blenheim was to Sir John what St. Paul's was to Wren—the opportunity of his lifetime, by which he would be

judged and with which his name would be handed down to posterity. To build a monumental palace in a noble park on such a scale, and to be backed by the nation's purse, was in reality a greater opportunity than Wren had before him when he built a metropolitan cathedral, hampered by liturgic difficulties and jealous criticisms.

Nothing can well be grander than Sir John's plan and general conception of Blenheim Castle, as shown in Fig. 61 (*c*). The garden front, 323 feet in length, was flanked on one side by the private apartments and on the other by a

Fig. 73

magnificent library 182 feet from front to rear. In designing the façade, he carefully avoided all the faults of Versailles, which was the typical palace of the day, as well as the tameness that was the feature of Winchester and Hampton Court.

187. Castle Howard, Fig. 72, was erected by Vanbrugh about the same time as Blenheim. It is similar in plan to Blenheim, but much smaller, though his skilful treatment of the façade has made it appear much larger than it really is.

188. Somerset House.—Somerset House, Fig. 73, erected by Sir William Chambers toward the end of the 18th century, was a very successful design, though far

beyond the ability of the architect. The bold, rusticated basement supports a range of three-quarter Corinthian columns, and a well-proportioned balustrade surmounts the whole in a pleasing and artistic manner.

Fig. 74

189. Church of St. Martin.—The church of St. Martin in the Fields, Fig. 74, by James Gibbs, shows the growing tendency toward the complete revival of classic forms. Were it not for the tower and spire this structure might readily pass for an amphiprostyle Corinthian temple. The plan is rectangular with a projecting portico at each end.

The entablature is carried entirely around the building, being supported by pilasters at the sides. The spire is pleasingly proportioned and is octagonal in plan, springing from the top of a square tower.

REVIEW EXERCISES

1. What contrasting influences did England's geographical position have on her Gothic and Renaissance architecture?

2. Describe briefly what religious influences led to the establishment of the great English manor houses.

3. What foreign artists and architects influenced the English Renaissance?

4. What was the most progressive period of the English Renaissance?

5. What are the distinguishing characteristics of Elizabethan architecture?

6. Describe the characteristics of English Renaissance ornament and illustrate by sketches, if necessary.

7. (*a*) What two native architects developed the Renaissance in England? (*b*) What were the chief works of each?

8. What religious conditions checked the force of Italian influence in English architecture at the beginning of the Elizabethan period?

9. (*a*) What sovereigns ruled in England from the middle of the 13th to the end of the 17th centuries? (*b*) Which of these favored the Church of Rome, and which supported the Church of England?

10. What two men succeeded Sir Christopher Wren as leading architects of the period?

CLASSIC REVIVAL

CHARACTERISTICS

190. The essential difference between the architecture of the Renaissance and that of the Revival period may be defined as follows: The former was the adoption of classic Roman details to modern forms, while the latter required the complete subjugation of modern forms and necessities to accommodate the plan and arrangements of a Greek or a Roman temple. Although classic details only were used in St. Peter's and St. Paul's, these structures would never be taken for anything but Christian churches. Whitehall and Versailles were the residences of the kings of the age in which they were built, and pretend to be nothing more. No one could think of St. Peter's as a Roman temple, and Versailles is as unlike the palace of the Cæsars as a building possibly could be, and so it occurs throughout the three centuries during which Renaissance was practiced. But, the Walhalla, at Ratisbon, pretends to be an exact reproduction of the Parthenon, and the Madeline, at Paris, is intended to be the counterpart of a Roman-Corinthian temple. St. George's Hall, Liverpool, is supposed to contain no feature later than the age of Augustus. Thus the early years of the 19th century were the beginning of a period of architectural slavery never before equaled. Architects no longer required originality, and the one that possessed it was supposed to suppress it entirely and to reproduce some pagan building, line for line, fitting his purpose to the classic form the best way he could, regardless of convenience, character, or tradition.

191. In Italy, there was, strictly speaking, no Classic Revival, as the Renaissance so thoroughly suited the tastes and requirements of the people that there was no demand

for a change. In France, the frivolous designs and details of the period of Louis XV had become tiresome, and the prosperity of the country had so increased that the public impression seemed to be that the empire of France was to be the successor of that of ancient Rome. Severity and dignity of design, rather than delicacy and frivolity, was therefore demanded, and the duplication, line for line, of Roman temples was the method of its accomplishment.

In Germany, however, the Renaissance style had been such a failure that the country was not inclined to adopt any more Roman forms, and an adoption of purely Greek designs was substituted; while in England, the influence of Palladio during the Renaissance was still sufficient to modify the style when Great Britain adopted the Greek Revival.

The effect of this revival in all countries was to increase the dignity and monumental effect of the streets at the expense of the convenience and practicability of the plans. Public squares and parks, surrounded by colonnaded buildings and deep porticos, were very fine to look at, but the porches and colonnades darkened the buildings and rendered them unfit for the purpose of their erection.

The Classic Revival period might be considered the result of too much education. Previous to the Renaissance there had been no general learning, and art forms had developed naturally from the constructive principles of the works in hand. There was but one general style available and this was based upon the fundamental principle of construction. The architecture of the castle was far different from the architecture of the cathedral, yet both were unmistakably Gothic.

With the Renaissance came the knowledge of a highly refined civilization. Buildings were erected with the old scientific construction, but the new classic ornament was used to embellish the structural features. Then architects traveled from all parts of Europe to study in Rome and buildings were embellished with complete Roman orders instead of fragments of classic ornament. Later, architectural students returned with actual measured drawings of existing buildings, and architecture fell from a fine art to an imitation.

CLASSIC REVIVAL IN FRANCE

192. In France, the Classic Revival made its appearance during the reign of Louis XVI, and the tendency toward it can be seen even before that. The Hôtel des Invalides, Figs. 45 and 76 (*a*), erected during the reign of Louis XIV, shows nothing but the most servile imitation of Roman forms, but at the same time admits the necessity of windows, which are grouped to harmonize with the design.

FIG. 75

193. Church of St. Genevieve, or Pantheon.—In the Pantheon, at Paris, Fig. 75, however, we see a noble building architecturally asserting itself to be a Roman temple, when, as a matter of truth, it is a Christian church dedicated to St. Genevieve. In plan, Fig. 76, this structure presents a Greek cross 362 feet long and 267 feet wide, over the intersection of the arms of which rises a dome that is 265 feet in height and 69 feet in diameter. The whole

exterior, as shown in Fig. 77, is a cold, severe, but extremely refined, composition. The elegant portico of colossal Corinthian columns, and the fine peristyle around the drum of the dome, combine to characterize the design as one of great dignity and effect. The sides are plain wall surfaces,

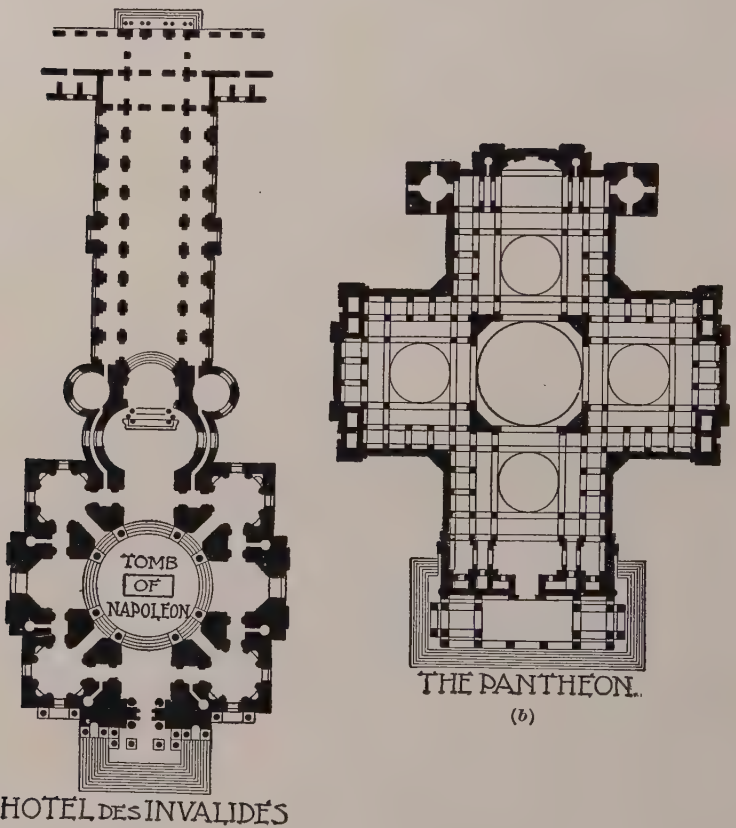


FIG. 76

unbroken by window openings or carved ornaments, except the festoons along the frieze under the cornice. Light is admitted through the roof, the greatest care and ingenuity having been exercised to hide the fact that interior illumination of the edifice was necessary.

325 FIG. 77

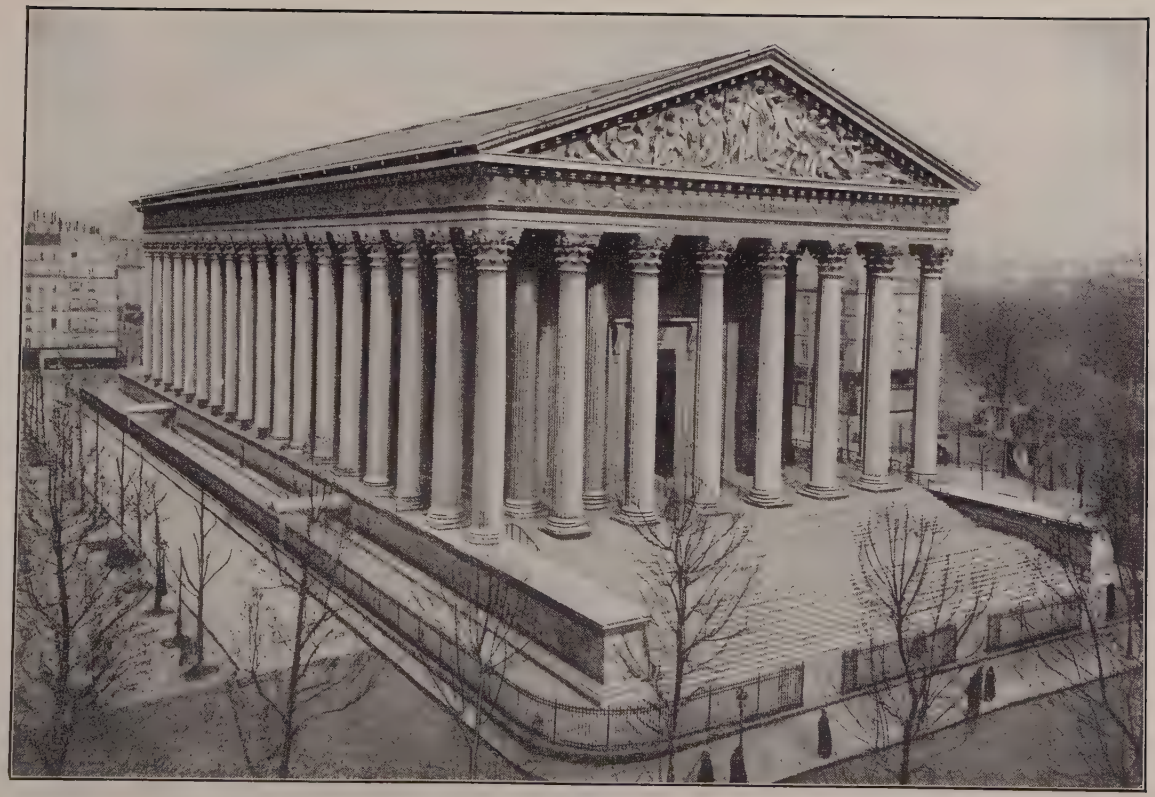


FIG. 78

194. The Madeline at Paris.—The Madeline, Fig. 78, is even more extreme in the effort to depict a purely pagan design than is the Pantheon. Here, there is what appears to be a Roman-Corinthian peristylar temple, every line of which is carefully proportioned according to classic antecedents, though its purpose is to provide a place for Christian worship. Classic as this structure may appear in design, it

Fig. 79

is certainly not so in construction. Each column is built up of small pieces of stone, the joints of which materially interfere with the effect of the fluting. The lintels that span the intercolumniations of the peristyle are not single stone beams as in the temples of Rome and Greece, but are constructed of voussoirs, like a flat arch. In ancient columnar architecture the spacing of the columns was governed by the length of lintel that could be conveniently quarried; hence,

the intercolumniations were comparatively small. In the Madeline, the intercolumniations are still maintained according to the ancient standard, though there is no structural necessity for it. However, the Parisians desired their city to be a second Rome, and in order to carry out the appearance, they confined their architectural designs to the duplication of Roman edifices of historical renown.

195. Arch du Carrousel.—The effort to make Paris a second Rome was not confined to architecture entirely, but the manners, customs, and even the dress of the people were as close an imitation of the days of ancient Rome as the climatic and geographical conditions would permit.

Streets and public squares were embellished with columns of victory and triumphal arches, and statues of heroes adorned the parks. The Arch du Carrousel, Fig. 79, was erected to commemorate the triumphs of Napoleon in the campaigns of 1806. It stands at the head of the Avenue Champs Elysees, the finest and most monumental thoroughfare in Paris, and in the center of the outer court of the Louvre Palace. (See Fig. 87.) At the opposite end of the Avenue Champs Elysees, two miles distant, stands another memorial arch 160 feet in height and elaborately sculptured with characteristic and symbolic groups of figures. In the Palace Vendome, not far from the Louvre, stands a column 140 feet in height, carved in low relief, commemorating Napoleon's campaigns in 1805. It is similar to Trojan's column in Rome, Fig. 86, *History of Architecture and Ornament*, Part 1. Numerous other monuments of a similar character were erected at later dates throughout Paris, most of which were of Roman rather than Greek model, as the empire of Napoleon was overthrown in 1815 and the monarchy restored.

CLASSIC REVIVAL IN GERMANY

196. In Germany, the Classic Revival wasted little time on Roman forms. This was due partly to the fact that the Renaissance had been so misunderstood, and partly to the inappropriate associations of Roman pomp and splendor with Germany's condition of finances. The long war between the Catholics and Protestants in the 17th century had nearly ruined Germany, while it had caused France to become the leading nation of Europe; and the next hundred years added but little to Germany's interests, while France continued to grow in power.

The German's taste then inclined to quiet and retiring ideas, and the recently discovered art treasures of Greece appealed strongly to his instincts. The literary works of the German poets, Lessing, Goethe, and others, diverted the public mind to the study of Greek art, and the discoveries of Stuart and Revett, and their publication of the "Antiquities of Athens," gave the contemporary architects models by which to be governed.

197. The Walhalla.—In this period Leo von Klenze erected, at Ratisbon, a monumental structure known as the Walhalla, which was exteriorly an exact model of the Parthenon, two-thirds the dimensions of the original at Athens. This architect saved himself an immense amount of responsibility by copying so celebrated a building, and while praise may be due him for the accuracy of the reproduction, he is certainly deserving of the most severe criticism for the erection of so classic an edifice on a lone hill, where its sole surroundings are the high roofs and slender spires of the German villages.

198. The Ruhmeshalle.—The Ruhmeshalle, at Munich, Fig. 80, is **E**-shaped in plan, with a colossal statue of Bavaria occupying the central portion. It was erected to contain the statues of Bavaria's great men, and was dedicated to their memory. Although it was not copied after any Greek building, it is purely Greek in design and is correct in form and

FIG. 80

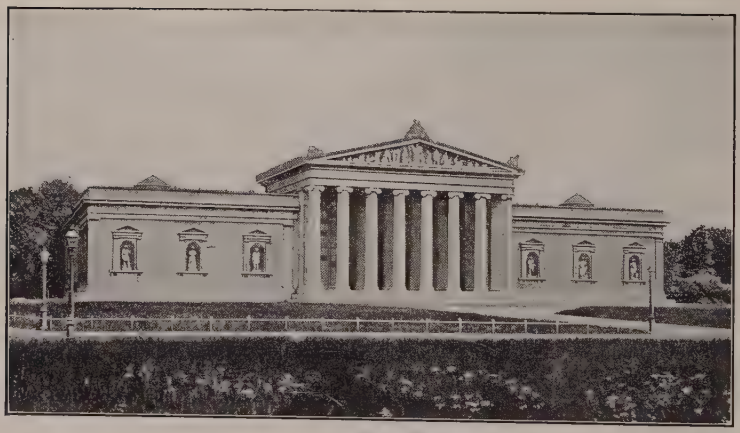


FIG. 81

proportion down to the smallest detail. It forms a fitting background, and adds dignity to the colossal figure in front, without appearing unsuited to its surroundings, as did the Walhalla as just stated.

199. The Glyptothek.—The Glyptothek, or sculpture gallery, at Munich, Fig. 81, was designed by the same architect as the Walhalla. Though not a servile copy like the former structure, its most original feature, the Ionic portico,

FIG. 82

is its strongest defect, being out of proportion and distinctly unrelated to the detail of the surrounding parts.

200. City Gate at Munich.—In the city gate of Munich, Fig. 82, Von Klenze was much more successful. The somber dignity of the Grecian-Doric order appears well suited to the purpose of this structure, and seems to have been well understood in principle by the architect. The design, though thoroughly Greek in spirit, is at the same time sufficiently modern to prevent the feeling that the intent and purpose

of the monument has been in any degree sacrificed in order to suit the conditions imposed by the style.

201. Parliament Houses at Vienna.—The parliament houses at Vienna, Fig. 83, unites with a dignified composition of pilasters and entablatures supported on a substantial base, a caryatid portico that in no way harmonizes with the rest of the design.

Fig. 83

202. The Greek Revival in Germany presents the aspect of a sincere striving for beauty on the part of a few talented architects, who labored under the false impression that the forms and details of an ancient and extinct civilization were suitable to the conditions of society as it existed at the close of the 18th century. The period is marked by examples of excellent planning, admirable construction, and most carefully studied detail; but it failed from an artistic standpoint through the lack of harmony in social, religious, and political conditions of two peoples living twenty-two centuries apart.

CLASSIC REVIVAL IN ENGLAND

203. Of the Classic Revival in England there is little in praise to be said. The modified Palladian style of Wren and his successors continued until superseded by the Greek Revival, which never succeeded in combining any two features of beauty and utility. A plain façade, with unmolded rectangular windows, was embellished with a four- or a six-columned Ionic portico and called Greek; or, a street front was erected without any windows, and covered with a sculp-

FIG. 84

tured pediment, to establish its style of architecture, while in the rear a multiplicity of windows gave the necessary light. Windows have always been the stumbling block of the revived Greek style, and the application of the revival to a modern structure requires the omission of the windows.

204. Fitzwilliam Museum.—The Fitzwilliam Museum, at Cambridge, Fig. 84, is a well-proportioned structure, whose purpose requires no windows and therefore fits itself to the style. The arrangement of the portico, the treatment of the pilasters, and the molding of the cornice

are decidedly more suggestive of Roman than of Greek models, showing how inefficient the pure Greek design is to a purely modern purpose.

205. St. George's Hall.—St. George's Hall, at Liverpool, Fig. 85, is a building whose imposing peristyle and projecting porches are decidedly Greek in spirit, though the plan and details are decidedly Roman. The utility of the

FIG. 85

building, however, is sacrificed to a certain extent, as the colonnade cuts off the light and is an utterly useless appendage, except to stamp the design as belonging to the efforts of the Greek revival.

206. Royal Exchange.—The Royal Exchange, at London, Fig. 86, presents a portico that would be more suitable for a Roman temple than for a modern business building. Behind this portico, the window openings are hidden in the effort to render them subordinate to the classic detail.

207. It will thus be seen that in England, as in Germany, the application of the architecture of the age of Pericles to the structures of the 19th century was found to be impracticable. After repeated efforts and many failures, the style was abandoned and has ceased to be practiced, except in rare instances, down to the present day.

I L T 303—41

FIG. 86

RECENT ARCHITECTURE IN EUROPE

208. Up to this point, the progress of architecture and the development of architectural styles, from the days of ancient Egypt to the middle of the 19th century, have been treated. It has been shown how the characteristic details of Greek architecture grew out of constructive principles; how these details were adopted by the Romans and used as decorative adjuncts to their triumphs of engineering skill, while the structural device that called them into existence was ignored; and how the engineering science of the Romans was developed and improved on by both the Byzantine and the Gothic system of construction. But with these styles, *architectural* construction ceases to exist. With the Renaissance, architectural design and architectural construction were separate and distinct considerations. With the Classic-Revival period, construction and arrangement of plan were each an independent problem, and the dawn of the 19th century found architecture in a thoroughly misunderstood condition.

The past century has been preeminently one of progress, particularly in scientific, mechanical, and commercial lines, and the demand for utility in every structural detail has prevented architecture from taking its proper place in the march of progress. Nevertheless, the artistic spirit has not been entirely crushed out by commercialism, and the numerous international exhibitions, the increase in the number of museums, schools of art, etc., have wakened a latent desire for something more than merely utilitarian construction.

209. France, Germany, and England are the countries that must be looked to for modern development. Italy never emerged from the style of the Renaissance; Spain lost her power in the beginning of the 17th century, and repeated invasions and internal revolutions prevented any

218–I L T 101, 303 § 51

architectural advancement; while Holland and Belgium were so concerned in the political changes of Spain, France, and England, that little time was devoted to the fine arts other than painting.

210. In France, the School of Fine Arts, at Paris, systematized and unified the national architecture, but at the same time prevented a free development of ideas. In consequence, French architecture has adhered to the principles of the Renaissance, though slight breaks have occurred in the progress of a modern Renaissance development. These breaks were in the form of an attempt to introduce the Greek Revival, which failed, and a strong Revived Gothic movement, represented by a very able and celebrated architect and writer, Viollet-le-Duc. The Gothic movement produced no very important buildings, but it was fruitful in the restoration of a great many medieval churches and castles, which would otherwise have gone to ruin.

211. The reign of Napoleon III (1852 to 1870) was a period of exceptional activity, especially in Paris. The Louvre was finally completed by two architects, Visconti and Lefuel; the Tuileries was partly remodeled and completed by the same architects; the New Opera House was built by Garnier; and numerous public fountains, elaborate in design and construction, were erected in streets, which were remodeled and extended at this time, making Paris one of the most monumental cities in the world.

212. The Completed Louvre.—Fig. 87 shows the outer court of the Louvre, facing the Place du Carrousel. The treatment of the two facing wings constitute one of the most notable examples of modern French architecture. Fig. 88 shows the Pavilion Richelieu in the center of the above façade, from the details of which the character of the design may be more closely observed. In Fig. 89, another pavilion is shown, in which the characteristic mansard roof is introduced. The ornamental details of these façades are extremely refined and beautifully proportioned, and show plainly the influence of the National School of Fine Arts.

Nothing in the designs exists there without a reason—either traditional or structural—and all is harmonized according to a well-governed system practiced in the French school of art.

Fig. 88

There are certain defects, to be sure, but the critic must hunt for them, as they are not glaring, and they are so outweighed by the good points that there can be no hesitancy in commending the design as successful from every point of view.

FIG. 89

213. Academy of Music at Paris.—The Academy of Music, or Paris Opera House, by Garnier, Fig. 90, built between 1863 and 1875, stands next to the Louvre in importance as a national monument. This structure is by far the most elaborate and richly decorated building for amusements in the world, but in purity of detail and harmony and refinement of its design is far inferior to the Louvre. In this structure the public taste for gorgeousness is catered to, rather than the demand of the refined intellect for harmony of proportion. This façade loudly proclaims the sentiment, "The nation is rich and can afford to spend its money on elaborate carvings, bas-reliefs, and painted frescos." In contrast to this, consider the ancient Greek structures, whose every detail proclaimed, not wealth and egotism, but intellectual development and refined appreciation.

214. The systematic study required by the National School of Fine Arts, the restrictions of the government as to those who shall practice architecture, and the thorough education of the artisans, whose fathers have followed the same trade for generations back, have all combined to place French architecture and the French style in design ahead of the rest of the world at the present day. While England has been wavering between two antagonistic styles and Germany has vainly struggled with her classic forms, France has steadily advanced in the development of a modern school of Renaissance.

France, England, and Italy all have educational institutions where architecture is taught as a profession, but there can be little doubt that the School of Fine Arts in Paris has thus far accomplished the most satisfactory results.

This may seem strange when one considers that it was from Italy that the Renaissance style emanated, but it is also a fact that the Renaissance architects of Italy were sculptors, painters, and literary men rather than constructors, while the French Renaissance architects had been long trained in Gothic construction before studying the Italian system of design.

FIG. 90

GOTHIC REVIVAL

215. About the middle of the 19th century, a number of enthusiastic students of the British medieval monuments endeavored to revive the Gothic as a national style of architecture. These enthusiasts were bitterly opposed by the practicing architects of the Classic Revival, and the arguments became so active that in the principal art societies all discussion of the relative merits of the two styles was suppressed.

The revived Gothic, however, is not the same as that of the 12th century, although when the style was first revived, the general tendency of the practice was to make every detail archeologically correct; but it was soon learned that medieval Gothic was no better suited to modern requirements than the classic Greek or Roman. Between the years 1850 and 1870, the striving for historical correctness of detail gave place to a rational effort to adapt Gothic principles to modern requirements, instead of merely copying extinct styles, and the result is a number of extremely interesting buildings.

216. Parliament Houses at Westminster.—Chief among structures of this class are the Parliament Houses, at Westminster, Fig. 91, designed by Sir Charles Barry, in the style of the Perpendicular period. This immense structure is the most successful edifice in the Victorian Gothic style. Its masses are simple and its detail is well studied and refined, while the entire composition is dignified and imposing. It is defective, however, in the proportioning of its details to the general mass. The details are made to appear insignificant by the vastness of their surroundings, and the two principal towers—one at the angle and the other in the center—are out of proportion to the building and to each other. The central tower would appear much more

Fig. 91

imposing if not dwarfed by the great Victoria Tower at the angle, while the latter would harmonize with its flanking façades if it were smaller and better proportioned to their details.

217. Other buildings designed in this style were inclined to the same excesses, so that at the present day architecture in Great Britain is suffering from the same uncertainty as at the beginning of the 19th century—some architects still favoring the Gothic, while others are designing in the style of the Renaissance, and still others are endeavoring to draw an inspiration from the revived Classic.

This is not an artistic age, and the striving for originality in design is preventing the advancement of architecture along healthy and rational lines.

As there never was a general acceptance of either contention the movement was confined almost exclusively to church building. It was argued that a small building could not be Gothic in its stricter sense, as there was no vaulting, and that a castle or fortress was theoretically not Gothic, as its vaults were sustained by enormously thick walls instead of by flying buttresses. Therefore, as structural iron and tile blocks were suitable for fireproof roofing, vaulting had become obsolete and without vaulting Gothic architecture could not exist.

Many parish churches were erected, however, in what was intended to be a pure modern Gothic; but while many were carefully studying the medieval moldings and details that were to be duplicated in projected structures, others were experimenting with the effects of Italian Gothic with its polychromic decoration and with French Gothic with its rich effect in sculpture.

What was afterwards termed Victorian Gothic was in many instances English Gothic materially altered by the introduction of Italian and French detail, principally details in colored marbles, patterns of brickwork, and sculptured figures.

AMERICAN ARCHITECTURE

EARLY COLONIAL PERIOD

218. The successful colonization of America was not accomplished until the beginning of the 17th century, and the hardships of the colonists were at first so great that little attention was given to architectural development until the beginning of the 18th century. Buildings of stone were not undertaken by the early English colonists, though brick structures were erected in the southern and Dutch colonies.

About the beginning of the 18th century, the influence of Wren's designs in England began to exert itself to a small extent in the southern English colonies, though the structures were nearly all erected of wood or of brick and wood. From 1725 to the Revolution, the population increased along the coast, and with the gradual acquirement of wealth there was an advancement in the character of the architecture, as seen in the dwellings and churches of the American aristocracy. During this period, the development of what is now known as the *Colonial style* took place. It was based on ideas drawn from the classic in England, particularly that phase of the revival which appeared during the reigns of Queen Anne and the Georges. The details, however, were extensively modified by the use of wood instead of stone and by the employment of designers that were not educated and trained in the Old-World architectural traditions. The style, especially in interior design, exhibited the taste and culture of the colonial aristocracy in its delicate and refined treatment of the woodwork, but there were no buildings erected in this style that were of a really monumental character. Stone edifices were very scarce, and the administrative buildings of the principal cities were small, unpretentious structures, built within the insufficient grants of the king.

219. Besides the British settlements in America there were, before the colonies achieved their independence, sections settled by Holland, Spain, and France, and many of the New England settlers sojourned a long time in Holland before sailing for America. The architecture of each of these countries, therefore, influenced the style of the new Republic, as the local precedents were followed even after England controlled the coast settlements that were afterwards to constitute the first thirteen states, and English architectural style was to predominate in the best buildings.

New York was settled by the Dutch, and their characteristics affected the architecture of the Hudson valley settlements up to the Mohawk river. Florida was settled by the Spanish, and although it did not come into the United States until 1812, its Spanish architecture influenced the coast colonies as far north as South Carolina.

The dwellings exhibit clearly the different tastes of the different colonies, though they all possess features of common origin in the mother country. In Maryland and Virginia, which were colonized by a wealthy class of English subjects, are found fine brick manor houses and extensive grounds. The grounds are surrounded by high brick walls and are entered through broad gates of artistic design. The interiors of these southern colonial houses are usually very elaborate, the side walls of the large high-ceilinged rooms being decorated with stenciled or frescoed patterns of the urn and festoon of the Adam brothers in England. Rich mahogany sideboards of Sheraton design and bandy-legged furniture of Chippendale, together with broad open fireplaces, suggestive of the reign of Elizabeth, form characteristics inseparable from the spirit of the design of the American colonial manor house of Maryland or Virginia.

220. In New England, the majority of the residences were of wood. The plans were more compact, and the exteriors were more picturesque, but they were lacking in the dignity and stateliness of the southern manor. The interior details, wainscots, cornices, stairs, mantels, etc.,

were essentially the same as in the South, and each showed a skilful adaptation of the classic forms and details to the slender proportions of a wood construction. Externally, the orders appear as supporting details for veranda and porch roofs, and in the form of colossal pilasters flanking and subdividing the façades, as shown in Fig. 92, which is a view of the old Cragie House, at Cambridge, Massachusetts, built in 1757, and afterwards the residence of Henry W. Longfellow.

The interest in American colonial architecture lies chiefly in the taste and ingenuity displayed in the translation of

Fig. 92

classic details from stone into wood. The American colonists were of English descent, and, persecuted though they may have been, they loved their mother country, and far from desiring to start any sort of an independent style of their own, they copied their designs from the contemporary English style, and erected in wood what they had not the means nor the skill to carve in stone, and took pride in the accuracy with which they adhered to the details of the parent style.

EARLY REPUBLICAN PERIOD

221. After the Revolutionary War, the new conditions of independence and self-government caused the American people to take a new interest in building projects and to undertake the erection of structures that should be monumental as well as purely useful. Capitols and other buildings for the national and state governments, and municipal buildings in the cities, were erected at this time, and though the style was after the late Renaissance of Wren and his followers, there was a considerable admixture of French details, due no doubt to the active sympathy of the French people during the war.

222. Capitol at Washington.—The United States Capitol, at Washington, Fig. 93, was commenced in 1793, and consisted of the central portion of the present building, without the dome. The rusticated basement and high-columned portico, together with the pedimented windows in the first story and the square masonry openings above, are strongly suggestive of the façade of Somerset House, Fig. 73, and it is not improbable that Thornton, Hallet, and Latrobe, the successive architects, drew more or less inspiration from that edifice. The building was not finally completed until the year 1830, when, under the supervision of Charles Bulfinch, the two flanking wings were added, thus making this monumental structure one of the finest legislative palaces in the world.

223. The dome is the principal feature. It rises from the ground line to the top of the statue of liberty, which surmounts it, a height of 287 feet, while its diameter inside is 94 feet. This dome is smaller than the dome of St. Paul's, London, but in design is quite as imposing as the creation of Sir Christopher Wren.

The dome over the Pantheon, at Rome, is a concrete vault supported by massive walls. The dome over Hagia Sophia, at Constantinople, is a masonry construction supported on four immense piers. The dome over St. Peter's is constructed in two shells, the inner one for interior effect

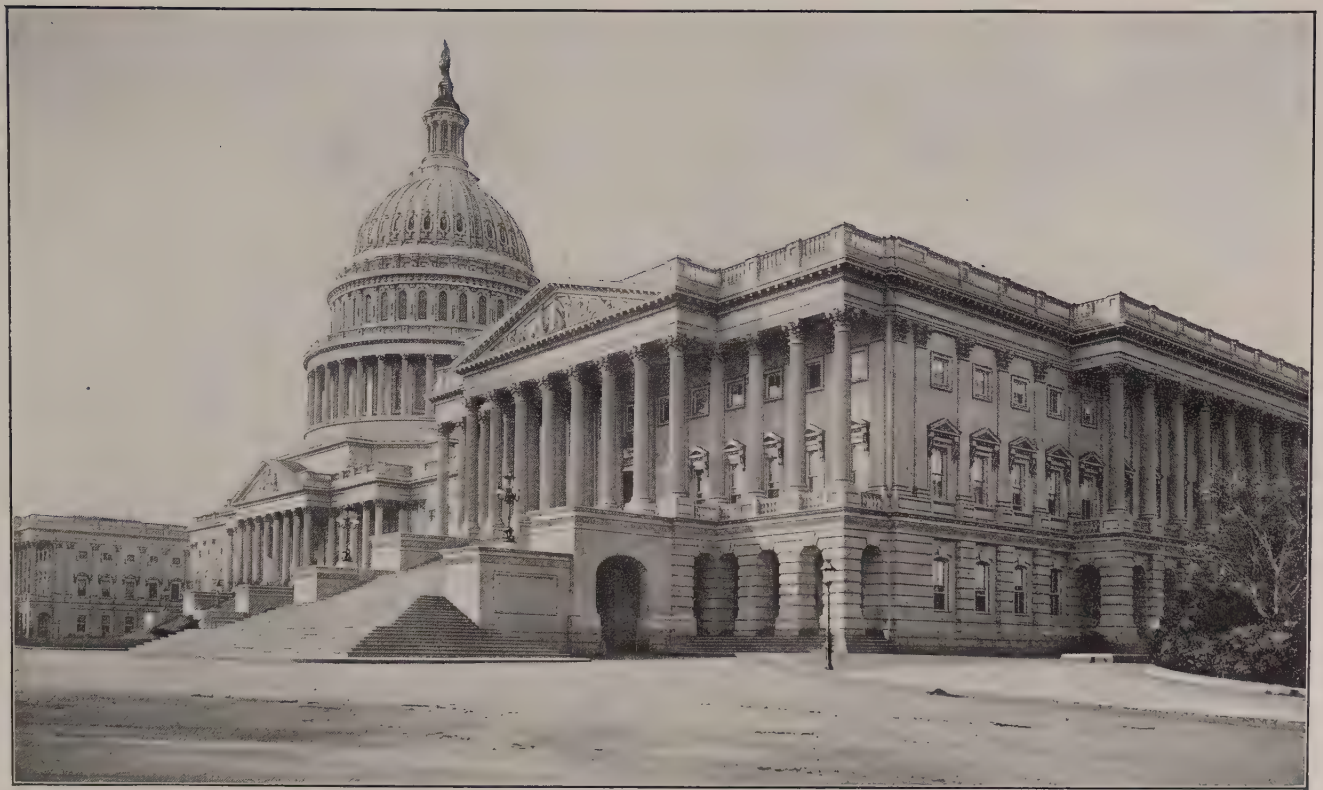


FIG. 93

and the outer one for exterior effect. Over the Hôtel des Invalides is a stone inner dome and a lead-covered outer dome of wood, while St. Paul's Church, at London, has an inner dome of stone, an outer dome of wood, and between them a tall cone of brick to carry the stone lantern above the wooden roof. There has thus been an advancement in the combination of design from an artistic standpoint and design from a structural consideration, but the advancement has been at the expense of architectural honesty and truthfulness. The exterior dome in these latter-day constructions is not what it claims to be by appearance—namely, the roof over a portion of the interior of the building—but is an exterior roof over an interior ceiling, with no connection or relation to the structural requirements of the interior at all. Down to the building of the United States Capitol, it was traditionally assumed that the architectural dignity of the structure required at least one of these domes to be of masonry construction, in order to be solid, substantial, and fireproof. But the design of the dome at Washington set aside all traditions, and called for a construction of one single material, namely, iron. No wood or stone is used anywhere in the dome. The absence of the former certainly insures it against fire, but the details are so suggestive of stone construction that the design is even more untruthful than St. Paul's. A vast shell of wrought-iron trusses, cast-iron columns, and sheet-iron covering is so treated as to appear like an architectural composition of stone; and though the details are well proportioned and refined, it detracts from the harmony to know that those details are products, not of the stone-carver's art, but of the pattern-maker's and the ironworker's skill.

224. White House.—The White House, Fig. 94, is the name given to the executive mansion, or residence of the president of the United States. This structure, commenced in 1792, is a typical example of the Classic Revival in America. It was designed by James Hoban, an Irishman, who patterned it somewhat after the house of the Duke of

Leicester, at Dublin. This, and the fact that it exceeded in size any private dwelling in America, gave cause for much opposition, and made Congress slow in providing the necessary appropriations. The building is constructed of sandstone, and several heavy coats of white paint applied to protect the stone from climatic influences caused the building to become known by its present name.

225. University of Virginia.—The University of Virginia, at Charlottesville, another classic edifice, was designed by Thomas Jefferson, the third president of the

FIG. 94

United States. The fact that Jefferson was an architect had much to do with the activity in building design at this period.

226. Girard College.—Another educational institution, Girard College, at Philadelphia, Fig. 95, shows to what extremes the Classic Revival was carried even in America. This building is designed to appear as a Roman temple. It is 218 feet long and 159 feet wide, and with its columns 6 feet in diameter and 55 feet in height, its marble exterior might have rivaled the Walhalla, were it not for the fact that instead of a cella, the colonnade encloses a very ordinary two-storied college building. Its details are well executed,

however, and its designer, in applying the elements of a Roman temple to the purposes of a modern college, was committing no greater error than his contemporaries on the other side of the sea, who had been endeavoring to accomplish similar impossibilities for three decades.

227. Other American Examples.—Other existing examples of the Classic Revival in America are the Treasury and Patent-Office Buildings in Washington, and the Subtreasury and old Custom House building in New York.

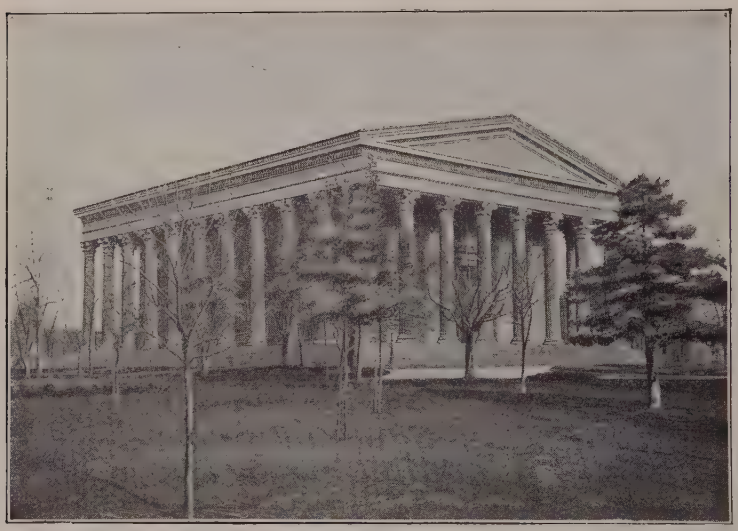


FIG. 95

228. Trinity and Grace Churches.—The decline of the Classic Revival, and the rise of the Victorian Gothic, in England, immediately found its echo in America, and Trinity Church, in New York, Fig. 96, designed by Upjohn, in 1843, as well as Grace Church, by Renwick, are worthy examples of modern Gothic work.

229. American Architects.—Between 1870 and 1880, the disastrous fires at Chicago and Boston gave opportunities for architectural improvement in those cities and greatly stimulated public interest in the art.

The establishment of architectural schools in Boston and New York, and the opening of public museums of art in the principal cities, caused the American public to wake up and be more critical of the things around them and to demand a higher grade of architectural design.

Fig. 96

At this time the personal influence of two men comes into great prominence: Richard M. Hunt (born 1827, died 1895), and Henry Hobson Richardson (born 1828, died 1886). These men, educated at the French National School of Architecture, showed the American public that architecture was a fine art and not a mechanical trade, and made the

people understand that the architecture of a country was the key to the education, refinement, and social condition of its inhabitants.

230. In Hunt's office, many of the most prominent American architects of the present day received their early training, while the works of Richardson exhibited such an independence of the prevailing styles in foreign countries, and at the same time so well suited the purposes for which

FIG. 97

they were erected, that, had his successors and followers understood the art better, a new style of architecture would likely have evolved.

Trinity Church, at Boston, Fig. 97, is considered one of Richardson's masterpieces. The design is what might be termed Romanesque, not in the sense of an adaptation of 10th-century Romanesque to American ideas, but an application of the Roman-arched construction to the 19th-century conditions. Broad, blank wall spaces of rock-faced masonry

are left where windows were not required, thereby presenting a rough, gladiator-like expression of crudity, characteristic of the period when the architecture of every country of Europe was feeling its way from the rejected classic arch toward the perfected Gothic vault. This architecture of Richardson's was true in its construction. Everything was real; no false domes nor senseless pilasters crowned the roof or graced the walls. Everything existed because it was needed, and details not wanted were omitted, without any attempt to fill blank wall spaces with relieving ornaments.

231. The opening of the French National School of Fine Arts to American students had a marked effect on the art education of the American people. Libraries were stocked with architectural works that would have been too expensive to have been purchased by the individual student, and all the important journals and publications of the day were soon at the service of ambitious students.

The great Public Library, at Boston, Fig. 98, is one of the largest and most important of these educational institutions. It was designed by McKim, Mead, & White, a firm of architects prominent through their adaptations of the designs of some of the best buildings of Europe to American uses. The Boston Library was an American rendering of the Library of St. Genevieve, at Paris. The New York State Building at the World's Fair, Chicago, by the same architects, was patterned after the Villa Medici (see Fig. 19). The tower of the Madison Square Garden, Fig. 99, is a very clever adaptation of the Giralda, at Seville (see *History of Architecture and Ornament*, Part 3, Fig. 83). The Herald Building in New York City presents a modified design after the Palace Consiglio, Fig. 5 (*b*). This adaptation of individual buildings is certainly not the highest form of art, but it presented for the study of the people a variety of good designs, which made them more appreciative of the architectural merits of their cities than would a lot of more original, more artistic, but less successful compositions.

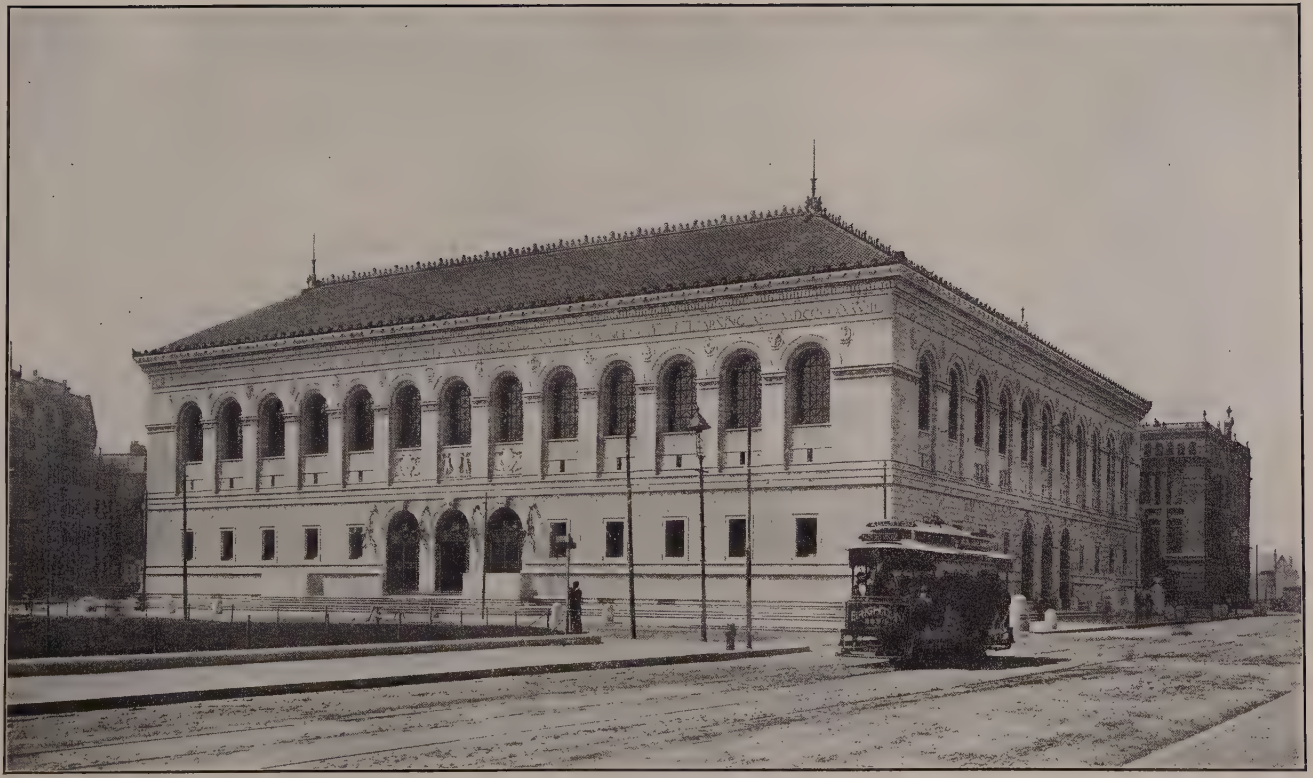


FIG. 98

232. Richardson designed and built about fifty prominent buildings in all parts of the United States, among which are the Court House at Allegheny, Pennsylvania; parts of the Capitol at Albany, New York; Armory at Detroit, Michigan; State Asylum at Buffalo, New York; and also the exhibition building at Cordova, in Argentine Republic, South America.

FIG. 99

Richard M. Hunt was more identified with residential architecture than with public buildings, and though his designs for mansions and villas were harmonious and above reproach, and are represented by the most elaborate and expensive dwellings in America, his great service to the profession, and indirectly to the architectural elevation of

the country, was in his establishment, in his office, of a regular system of instruction and training for architectural students. Much of the better architecture of the present day is due to this system and to those who studied under it. One of these students was William R. Ware, Emeritus Professor of Architecture at Columbia University and author of a number of architectural books, especially prepared for students' use. Among these is a treatise on the architectural orders, entitled The American Vignola, which discusses the orders as they are used in modern practice and provides a simple system of portraying them under a modern system of measurement. Another architectural writer of prominence that studied under Mr. Hunt is Henry Van Brunt, who is author of several essays upon styles and buildings that are of deep interest to the architectural student. Several architects prominent in American practice received their schooling in this office, among whom are Post, of New York; Furness, of Philadelphia; and Gambrill, who, until his death, was the partner of Richardson. Each of these men carried into his own practice the systematic style of Hunt's methods of working, and helped establish in the general architecture of their several localities an appreciation of the value of good architectural composition.

233. Hunt's early architectural training commenced at the age of fifteen when he went to Geneva and studied with Darier. At twenty he entered the School of Fine Arts under the direction of Hector Lefuel, the government architect. Hunt then traveled about Europe, Egypt, and Asia Minor until 1854, when he returned to Paris and rejoined Lefuel, who was then engaged in completing the northern gallery of the Louvre, the most important feature of which was to be the central pavilion. As a pupil of Lefuel's, Hunt designed this pavilion, and it was erected, with but slight alteration, under his personal supervision, when afterwards he was appointed inspector of the works.

Thus it was that one of the most important structures in modern French architecture was designed and erected by

an American architect. Later Hunt came to America and was associated with Walter in the extension of the Capitol at Washington, after which he moved to New York and opened an office where he received students for architectural training similar to that which he had obtained in Paris. It is not surprising to find Hunt's designs all more or less influenced by the French style and school of design. For many years Hunt was the best-known architect in America,

Fig. 100

and although he did not erect many public buildings, his residence designs are numerous. Among his principal works are Biltmore House at Asheville, North Carolina, a vast residence in the mountains, strongly suggesting the Francis I châteaux along the Loire; "Marble Hall" and the "Breakers," two residences at Newport in the later and more classic Renaissance; the W. K. Vanderbilt house, New York, Fig. 100, which is a most dainty piece of early Renaissance

work, strongly suggesting Chenonceau and Azay-le-Rideau, but well adapted to its urban position at the intersection of two of New York's busiest residence streets. He also built the Administration building of the Columbian Exposition, Chicago, the Lenox Library, New York, the National Observatory, Washington, and two buildings of the West Point Military Academy.

CONCLUSION

234. A review of a larger number of buildings erected in the 19th century would show no idea or development of greater importance than those already referred to, and as architects today are no nearer the invention of a new style than they were 200 years ago, the examples given are sufficient to show the progress made in this direction. The questions are often asked, Why do the architects of today copy ancient forms and never invent new ones? Why must all architecture be a reproduction of the Renaissance, Romanesque, or Gothic styles, and never strictly original and peculiar to the present time?

These questions may thus be answered: It should first be borne in mind that there are only two original styles of architecture—the *pagan* and the *Christian*, otherwise called the *classic* and the *Gothic*. All other styles, at best, are only diversified forms, affected by local combinations, mannerisms, and individual caprice. Thus, the natural tendency in the practice of architecture has always been little more than imitative of the past, a radical change having been accomplished only through the inspiration or enthusiasm of some grand religious, political, or social revolution. The conquest of Greece by the Romans gave birth to the Roman style of architecture, which was a combination of Greek design and Roman construction. The growth of Christianity produced the Romanesque style in the effort to adapt Roman design to a more economical system of construction. The Gothic was developed from the Romanesque construction when the traditions of Roman design were lost during the Dark Ages.

235. The enlightenment and education of the people toward the close of the 15th century enabled them to read for themselves what had heretofore been taught only by the priests; enabled them to judge for themselves what before had been interpreted only by the clergy. Different opinions thus arose, which led to a division of the Church. The introduction of pagan forms and details and the imitation of Roman luxuries and extravagances, mark the character of the Renaissance period, while the Classic and Gothic Revivals show the tendency of one class toward the intemperate admiration of heathen art, while the other class, led by the Church, endeavored to instil into the world at large a proper love and admiration for Christian forms.

Thus, it will be seen that in modeling after preexisting forms, architects of today are simply following the course that has been pursued ever since the infancy of art.

REVIEW EXERCISES

1. (*a*) What influences led to the Classic Revival in the several European countries? (*b*) What was the effect of the Classic Revival?

2. Name a building characteristic of the Classic-Revival period in (*a*) France, (*b*) Germany, (*c*) England. (*d*) Describe each.

3. What are the existing conditions affecting the development of architectural style in (*a*) France? (*b*) England?

4. (*a*) What are the characteristics of Victorian Gothic? (*b*) What is the most important building in this style?

5. What are the characteristics of Early Colonial architecture in America?

6. What American buildings reflect the influences of the (*a*) Classic Revival in England? (*b*) Gothic Revival in England?

7. What two American architects influenced the development of the architecture in the United States?

INDEX

NOTE.—In this volume, each Section is complete in itself and has a number. This number is printed at the top of every page of the Section in the headline opposite the page number, and to distinguish the Section number from the page number, the Section number is preceded by a section mark (§). In order to find a reference, glance along the inside edges of the headlines until the desired Section number is found, then along the page numbers of that Section until the desired page is found. Thus, to find the reference "Alhambra, The, §51, p148," turn to the Section marked §51, then to page 148 of that Section.

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